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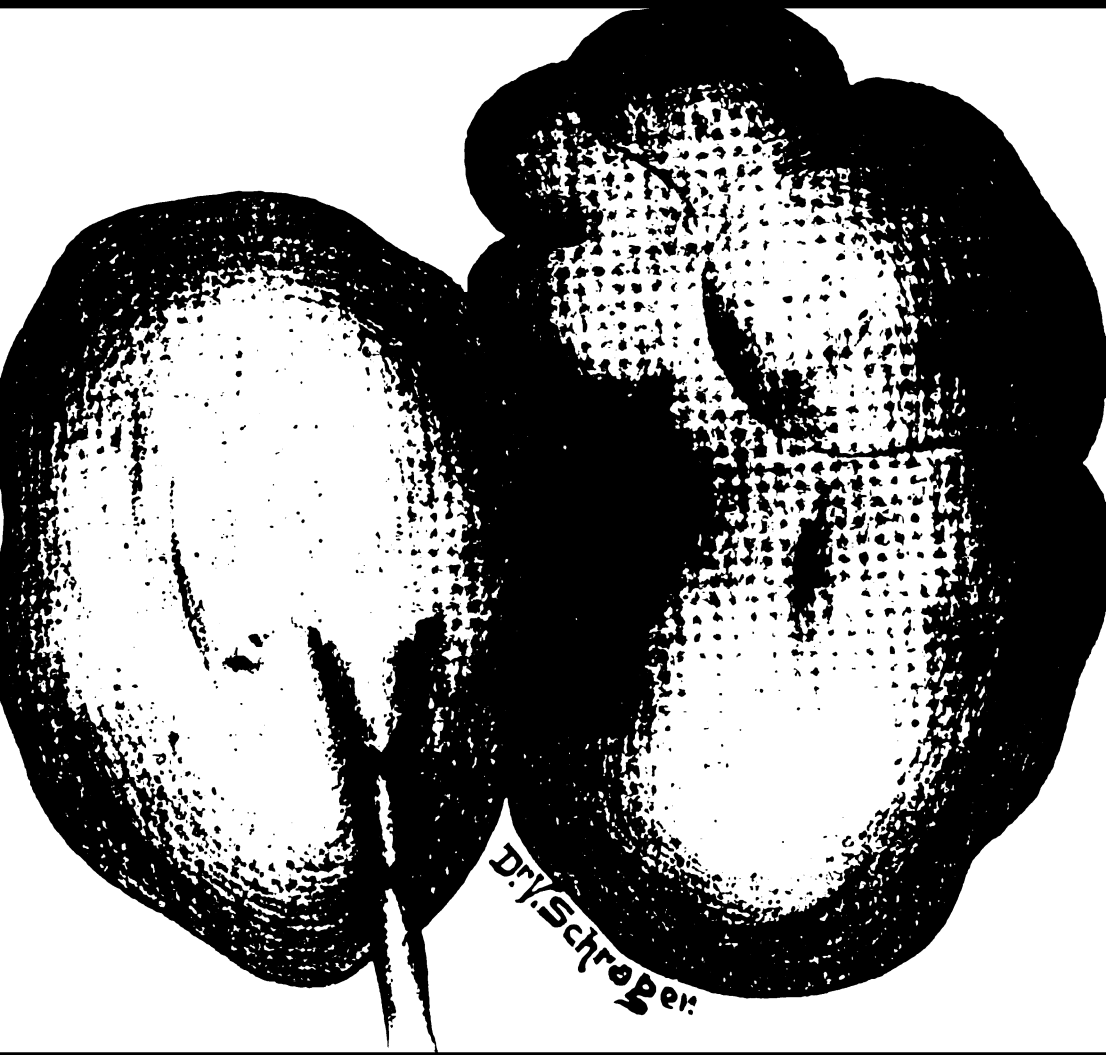

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TRANSACTIONS

OF THE

SOUTHERN SURGICAL AND GYNECOLOGICAL ASSOCIATION

VOLUME XVII.

SEVENTEENTH SESSION,

HELD AT BIRMINGHAM, ALABAMA,

DECEMBER 13, 14 AND 15, 1904.

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PUBLISHED BY THE ASSOCIATION.

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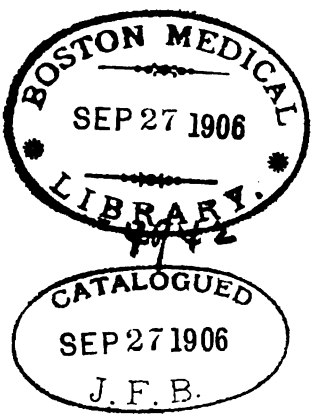

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W. D. HAGGARD, M.D., *Secretary*,
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1892.	*J. McFadden Gaston.	*Cornelius Kollock. George Ben Johnston.	*W. E. B. Davis.	Hardin P. Cochrane.
1893.	*Bedford Brown.	Joseph Price. George A. Baxter.	*W. E. B. Davis.	Hardin P. Cochrane.
1894.	*Cornelius Kollock.	A. B. Miles. J. B. S. Holmes.	*W. E. B. Davis.	Hardin P. Cochrane.
1895.	Louis McLane Tiffany.	Ernest S. Lewis. Manning Simons.	*W. E. B. Davis.	Richard Douglas.
1896.	Ernest S. Lewis.	Joseph Taber Johnson. Richard Douglas.	*W. E. B. Davis.	A. M. Cartledge.
1897.	George Ben Johnston.	W. E. Parker. Floyd W. McRae.	*W. E. B. Davis.	A. M. Cartledge.
1898.	Richard Douglas.	*H. H. Mudd. James A. Goggans.	*W. E. B. Davis.	A. M. Cartledge.
1899.	Joseph Taber Johnson.	F. W. Parham. W. L. Robinson.	*W. E. B. Davis.	A. M. Cartledge.
1900.	A. M. Cartledge.	Manning Simons. W. P. Nicolson.	*W. E. B. Davis.	W. D. Haggard.
1901.	Manning Simons.	George H. Noble. L. C. Bosher.	W. D. Haggard.	Floyd W. McRae.
1902.	*W. E. B. Davis.	J. Wesley Bovée. J. W. Long.	W. D. Haggard.	Floyd W. McRae.
1903.	J. Wesley Bovée.	Christopher Tompkins. Bacon Saunders.	W. D. Haggard.	Floyd W. McRae.
1904.	Floyd W. McRae.	George S. Brown. J. Shelton Horsley.	W. D. Haggard.	Charles M. Rosser.
1905.	Lewis C. Bosher.	J. D. S. Davis. I. S. Stone.	W. D. Haggard.	Charles M. Rosser.

* Deceased.

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HONORARY MEMBERS.

1894.—Foy, George,	Dublin.
1894.—Jacobs, Charles,	Brussels.
1894.—Martin, A.,	Berlin.
1902.—Maury, Richard B.,	Memphis, Tenn.
1894.—Morisani, O.,	Naples.
1894.—Pozzi, S.,	Paris.
1902.—Reamy, Thaddeus A.,	Cincinnati, Ohio.

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MEMBERS.

1900.—Baldy, John Montgomery, M.D. Professor of Gynecology, Philadelphia Polyclinic; Surgeon to Gynecean Hospital; Gynecologist to Pennsylvania Hospital; Consulting Surgeon to Frederick Douglass Free Hospital. 1722 Chestnut Street, Philadelphia, Pa.

1903.—Balloch, Edward A., M.D. Professor of Surgery Medical Department of Howard University; Surgeon to Freedmen's Hospital; Member American Academy of Medicine. 1013 Fifteenth Street, N. W., Washington, D. C.

1904.—Batchelor, James M., M.D. House Surgeon of Charity Hospital; Associate Professor of Surgery, Tulane University. New Orleans, La.

1901.—Baughman, Greer D., M.D. Lecturer on Hygiene; Demonstrator of Pathology; Demonstrator of Physiology; in charge of Gynecological Dispensary at Medical College of Virginia. 12 North Second Street, Richmond, Va.

1900.—Black, James Madison, M.D., B.S. Consulting Surgeon Southern Railway. West Church Avenue, Knoxville, Tenn.

1893.—Bloom, J. D., M.D. Consulting Surgeon, Touro Infirmary; Lecturer on Diseases of Children, Tulane University. New Orleans, La.

1901.—Boldt, Hermann J., M.D. Gynecologist to Post-Graduate Hospital, St. Mark's Hospital, German Polyclinic; Consulting Gynecologist, Beth Israel Hospital; Professor of Gynecology, Post-Graduate Medical School. 39 East Sixty-first Street, New York, N. Y.

1902.—Bonifield, Charles Lybrand, M.D. Professor of Clinical Gynecology, Medical College of Ohio (Medical Department University of Cincinnati); Member American Association of Obstetricians and Gynecologists; ex-President Cincinnati

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Academy of Medicine; ex-President Cincinnati Obstetrical Socity. 432 West Fourth Street, Cincinnati, O.

1890.—Bosher, Lewis Crenshaw, M.D. Professor of Practice of Surgery and Clinical Surgery in the Medical College of Virginia; Visiting Surgeon to the Memorial Hospital; Member of American Surgical Association; Member of the American Association of Obstetricians and Gynecologists; Member of Association of American Anatomists; Member of American Urological Association; ex-President of Richmond Academy of Medicine and Surgery. *Vice-President*, 1901; *President*, 1905. 717 East Franklin Street, Richmond, Va.

1895.—Bovée, J. Wesley, M.D. Fellow of American Gynecological Society; President of Washington Obstetrical and Gynecological Society; ex-President Medical and Surgical Society of the District of Columbia; Honorary Fellow Medical Society of Virginia; Professor of Gynecology of George Washington University, Washington, D. C.; Gynecologist to Providence, Columbia, and George Washington University Hospitals; Consulting Physician to St. Ann's Infant Asylum, and Attending Gynecologist to St. Elizabeth's Hospital for the Insane, Washington. D. C. *Vice-President*, 1902; *President*, 1903. The Rochambeau, Washington, D. C.

1889.—Brokaw, Augustus V. L., M.D. Professor of Anatomy in the Missouri Medical College, Assistant to the Chair of Surgery and Senior Assistant Surgeon, St. John's Hospital. Cor. Washington Boulevard and Taylor Ave., St. Louis, Mo.

1902.—Broome, G. Wiley, M.D. Consulting Surgeon St. Louis City and Female Hospitals; Member St. Louis Medical Society. 612 N. Taylor Avenue, St. Louis, Mo.

1898.—Brown, George S., M.D. Ex-President Jefferson County Medical Society. *Vice-President*, 1904. Birmingham, Ala.

1899.—Burthe, L., M.D. 124 Baronne Street, New Orleans, La.

1900.—Byford, Henry T., M.D. Professor of Gynecology, College of Physicians and Surgeons (University of Illinois), Chicago; Professor of Clinical Gynecology, Northwestern University Woman's Medical School; Professor of Gynecology, Chicago Post-Graduate Medical School; Professor of Gynecology, Chicago Clinical School; Surgeon to Woman's Hos-

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pital; Gynecologist to Chicago West Side Hospital. Reliance Building, 100 State Street, Chicago, Ill.

1902.—CALDWELL. C. E., M.D. Professor of Orthopedic Surgery, Miami Medical College; Visiting Orthopedic Surgeon, Cincinnati Hospital; Member Cincinnati Academy of Medicine. 1110 Cross Lane, Cincinnati, O.

1904.—CAROTHERS, ROBERT, M.D. Adjunct Professor of Surgery, Medical College of Ohio Medical Department, Cincinnati University, Cincinnati, O.

1903.—CARR, WILLIAM P., M.D. Professor of Physiology and Professor of Clinical Surgery, Columbian University; Surgeon to the Emergency Hospital and University Hospital; Consulting Surgeon to the Washington Asylum Hospital and the Government Hospital for the Insane, Washington, D. C. 1418 L Street, N. W., Washington, D. C.

1891.—CARTLEDGE, ABIAH MORGAN, M.D. Professor of Gynecology and Abdominal Surgery, Louisville Medical College; Visiting Surgeon to the Louisville City Hospital; Surgeon to the Louisville Home of the Friendless; ex-President of the Louisville Medico-Chirurgical Society. *Treasurer*, 1896–1899; *President*, 1900. 205 West Broadway, Louisville, Ky.

1899.—CATHCART, R. S., M.D. Assistant to Chair of Clinical Surgery in the Medical College of the State of South Carolina. 66 Hasell Street, Charleston, S. C.

1904.—CHAMBERS, P. F., M.D. Attending Surgeon, Woman's Hospital; Consulting Surgeon, French Hospital. 49 West Fifty-seventh Street, New York, N. Y.

1893.—COCRAM, HENRY S., M.D. 124 Baronne Street, New Orleans, La.

1893.—COLEY, ANDREW JACKSON, M.D. Councillor of the Medical Association of State of Alabama. Alexander City, Ala.

1902.—COLEY, WILLIAM B., M.D. Clinical Lecturer on Surgery, College of Physicians and Surgeons; Assistant Surgeon in Hospital for Ruptured and Crippled; Attending Surgeon to General Memorial Hospital; Fellow of the American Surgical Association, New York Surgical Society, and New York Academy of Medicine. 5 Park Avenue, New York, N. Y.

1904.—CRAIG, DANIEL H., M.D. Surgeon to Out-patients, Free Hospital for Women; Instructor, Boston Polyclinic. 386 Commonwealth Avenue, Boston, Mass.

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1902.—CRILE, GEORGE W., M.D. Professor of Clinical Surgery, Medical College of Western Reserve University; Surgeon to St. Alexis' Hospital; Surgeon to Lakeside Hospital. 275 Prospect Street, Cleveland, O.

1893.—CROFFORD, T. J., M.D. Professor of Physiology and Clinical Lecturer on Gynecology in the Memphis Hospital Medical College. 155 Third Street, Memphis, Tenn.

Founder.—CUNNINGHAM, RUSSELL M., M.D. Professor of Practice of Medicine and Clinical Medicine, Birmingham Medical College; Surgeon to the Pratt Mines Hospital. Ensley, Ala.

1894.—DANDRIDGE, NATHANIEL PENDLETON, M.D. Professor of Surgery, Miami Medical College; Surgeon to Cincinnati Hospital and Episcopal Hospital for Children. 422 Broadway, Cincinnati, O.

Founder.—DAVIS, JOHN D. S., M.D. Professor of Surgery, Birmingham Medical College; Surgeon to Hillman Hospital; ex-President of the Jefferson County Medical Society and of the Board of Health of Jefferson County. *Vice-President.* Avenue G and Twenty-first Street, Birmingham, Ala.

1891.—DEAN, G. R., M.D. Fellow of the American Association of Obstetricians and Gynecologists; President of South Carolina State Medical Association; ex-President Association of Surgeons of Southern Railroad. Spartanburg, S. C.

1900.—DEAVER, JOHN B., M.D. Surgeon-in-Chief to the German Hospital. 1634 Walnut Street, Philadelphia.

1892.—DIXON, ARCHIBALD, M.D. Ex-President of the Kentucky State Medical Society; ex-President of the McDowell Medical Society; ex-President of the Mississippi Valley Medical Association. Henderson, Ky.

1897.—DORSETT, WALTER B., M.D. Professor of Obstetrics and Clinical Gynecology, Marion Sims-Beaumont Hospital Medical College; Gynecologist to the Missouri Baptist Sanitarium and to Evangelical Deaconess' Hospital. 3941 North Belle Place, St. Louis, Mo.

1896.—DOUGHTY, W. H., M.D. Professor of Special Surgery and Surgical Pathology, Medical Department, University of Georgia; Chief Surgeon to Charleston and Western Carolina Railroad. 822 Greene Street, Augusta, Ga.

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Fellow of the American Association of Obstetricians and Gynecologists, and of the British Gynecological Society. *Treasurer*, 1895; *Vice-President*, 1896; *President*, 1898. 110 South Spruce Street, Nashville, Tenn.

1903.—Downes, Andrew J., M.D. 1725 Girard Avenue, Philadelphia, Pa.

1902.—Dudley, A. Palmer, M.D. Professor of Diseases of Women, New York Post-Graduate Hospital and Dartmouth Medical College; Member International Gynecological Society, American Gynecological Society, New York Obstetrical Society, and New York Academy of Medicine. 678 Madison Avenue, New York, N. Y.

1900.—Dunning, Lehman Herbert, M.D. Professor of Diseases of Women, Medical College of Indiana; Consulting Gynecologist to Indianapolis City Hospital and Dispensary. 224 N. Meridian Street, Indianapolis, Ind.

1890.—Earnest, J. G., M.D. Professor of Clinical Gynecology, College of Physicians and Surgeons; formerly Professor of Gynecology, Southern Medical College; Visiting Gynecologist to the Grady Hospital. Atlanta, Ga.

1891.—Elkin, William Simpson, M.D. Professor of Operative and Clinical Surgery, Atlanta College of Physicians and Surgeons; ex-President of the Atlanta Society of Medicine; Surgeon to Grady Hospital. 27 Luckie Street, Atlanta, Ga.

1900.—Ellis, James N., M.D. Surgeon to Grady Hospital; Gynecologist to the Presbyterian Hospital. 1204 Fourth National Bank Building, Atlanta, Ga.

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1904.—Finney, G. F. T., M.D. Associate Professor of Surgery, Johns Hopkins University; Surgeon to Out-patients, Johns Hopkins Hospital. 1300 Eutaw Place, Baltimore, Md.

1901.—Fort, Rufus E., M.D. Formerly Superintendent Nashville Hospital. 209 North Vine Street, Nashville, Tenn.

1895.—Fortier, S. M., M.D. Visiting Surgeon to Charity Hospital. 4422 St. Charles Avenue, New Orleans, La.

1902.—Freiberg, Albert H., M.D. Professor of Orthopedic Surgery, University of Cincinnati (Medical College of

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Ohio), and in the Laura Memorial Women's Medical College; Orthopedic Surgeon to the Cincinnati, Presbyterian, and Jewish Hospitals; Fellow of the American Orthopedic Association. 708 Walnut Street, Cincinnati, O.

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1903.—GALE, JOSEPH A., M.D. Surgeon-General Norfolk and Western R. R.; President of Medical Society of Virginia; Member of American Medical Association and of Roanoke Medical Society. Roanoke, Va.

1900.—GASTON, J. MCF., JR., A.M., M.D. 421 Capital Avenue, Atlanta, Ga.

1900.—GERSTER, ARPAD G., M.D. Attending Surgeon to Mt. Sinai Hospital; Consulting Surgeon to the German Hospital. 34 East Seventy-fifth Street, New York, N. Y.

1898.—GESSNER, HERMANN B., A.M., M.D. Chief of Clinic to Chair of Surgery, Demonstrator of Operative Surgery, the Tulane University; Visiting Surgeon, Charity Hospital; ex-President Orleans Parish Medical Society. 830 Canal Street, New Orleans, La.

1902.—GILLESPIE, REESE B., M.D. Member of the Medical Society of Virginia; Secretary and Treasurer Tazewell County Medical Society; Surgeon to Tazewell Sanitarium. Tazewell, Va.

1897.—GLASGOW, FRANK A., M.D. Professor of Clinical Gynecology of St. Louis Medical College; Gynecologist to St. Louis Mullanphy Hospital; on staff of Martha Parsons Free Hospital; Consulting Surgeon to St. Louis Female Hospital. 3894 Washington Boulevard, St. Louis, Mo.

1903.—GOFFE, J. RIDDLE, M.D. Professor of Gynecology, New York Polyclinic Medical School and Hospital; Gynecologist, New York City Hospital; Assistant Gynecologist to New York Skin and Cancer Hospital; Consulting Gynecologist, St. Joseph's Hospital, Yonkers, N. Y.; Fellow American Gynecological Society. 29 West Forty-sixth Street, New York, N. Y.

Founder.—GOGGANS, JAMES A., M.D. Ex-President of the Tri-State Medical Society of Alabama, Georgia, and Tennessee; Senior Councillor of the Medical Association of the State of Alabama; Fellow of the British Gynecological Society. *Vice-President*, 1898. Alexander City, Ala.

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1900.—GOLDSMITH, W. S., M.D. 262 Jackson Street, Atlanta, Ga.

Founder.—GRAHAM, JOSEPH, M.D. Member Charlotte, North Carolina, Medical Society; ex-Member North Carolina State Board of Health, and North Carolina State Board of Medical Examiners; ex-President North Carolina State Medical Society. Charlotte, N. C.

1892.—GRANT, HORACE H., M.D. Professor of Surgery in the Hospital College of Medicine; Surgeon to the Louisville City Hospital. 321 Equitable Building, Louisville, Ky.

1896.—GWATHMEY, LOMAX, M.D. Attending Gynecologist to St. Vincent Hospital and Dispensary. Norfolk, Va.

1896.—HAGGARD, WILLIAM DAVID, M.D. Professor of Gynecology, Medical Department, University of Tennessee; formerly Professor of Gynecology and Abdominal Surgery, University of the South (Sewanee); Gynecologist to Nashville City Hospital; ex-President Nashville Academy of Medicine; ex-Secretary Section on Obstetrics and Diseases of Women, American Medical Association (1898); Member of American Association of Obstetricians and Gynecologists, and Alumni Association of Woman's Hospital, of New York. *Treasurer*, 1900; *Secretary*, 1901–1904. 302 North Vine Street, Nashville, Tenn.

1892.—HALL, RUFUS BARTLETT, A.M., M.D. Professor of Clinical Gynecology in the Miami Medical College; Gynecologist to the Presbyterian Hospital; ex-President of the Cincinnati Obstetrical Society; ex-President of the American Association of Obstetricians and Gynecologists; Fellow of British Gynecological Society; Member of the American Medical Association and of the Ohio State Medical Society. 628 Elm Street, Cincinnati, O.

1901.—HAZEN, CHARLES M., M.D. Professor of Physiology, Medical College of Virginia. Bon Air (Richmond), Va.

1896.—HEFLIN, WYATT, M.D. President of the Jefferson County Medical Society. Birmingham, Ala.

Founder.—HERFF, FERDINAND, M.D. 308 East Houston Street, San Antonio, Texas.

1889.—HILL, ROBERT SOMERVILLE, M.D. Councillor of the Alabama State Medical Association; ex-President of the Medical and Surgical Society of Montgomery County; for-

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merly Surgeon of Second Regiment Alabama State Troops. Montgomery, Ala.

1902.—Hirst, Barton Cooke, M.D. Professor of Obstetrics, University of Pennsylvania; Fellow of College of Physicians, Philadelphia; Gynecologist to the Howard, Orthopedic, and Philadelphia Hospitals; Fellow of American Gynecological Society. 1821 Spruce Street, Philadelphia, Pa.

Founder.—Hogan, S. M., M.D. Grand Senior Councillor and ex-Vice-President of the Medical Association of the State of Alabama. Montgomery, Ala.

1900.—Hoke, Michael, M.D., B.E. 268 Peachtree Street, Atlanta, Ga.

1891.—Holmes, J. B. S., M.D. Ex-President of the Tri-State Medical Society of Alabama, Georgia, and Tennessee; ex-President of the Georgia Medical Association; Fellow of the American Association of Obstetricians and Gynecologists. *Vice-President*, 1894. Atlanta, Ga.

1900.—Horsley, John Shelton, M.D. Member of the American Medical Association, Richmond Academy of Medicine, and Medical Society of Virginia; Professor of Principles of Surgery, Medical College of Virginia; Surgeon to Memorial Hospital. *Vice-President.* 303 W. Grace Street, Richmond, Va.

1896.—Hundley, J. Mason, M.D. Associate Professor of Diseases of Women and Children, University of Maryland; President Clinical Society of Baltimore. 1009 Cathedral Street, Baltimore, Md.

1903.—Hunner, Guy Le Roy, M.D. Associate in Gynecology, Johns Hopkins University. 1420 Eutaw Place, Baltimore, Md.

1900.—Ill, Edward Joseph, M.D. Surgeon to the Woman's Hospital; Medical Director, St. Michael's Hospital; Gynecologist and Supervising Obstetrician, St. Barnabas' Hospital; Consulting Gynecologist, German Hospital and Beth Israel Hospital of Newark, N. J.; to All Souls' Hospital, Morristown, N. J., and to Mountain Side Hospital, Montclair, N. J.; Vice-President from New Jersey to Pan-American Congress of 1893. 1002 Broad Street, Newark, N. J.

1889.—Johnson, Joseph Taber, M.D. Professor of Gynecology and Abdominal Surgery, Georgetown University; formerly Gynecologist to Providence Hospital; Chief of Service

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of Gynecology and Abdominal Surgery, Georgetown University Hospital, and President of the Board of Administration; President of the Woman's Dispensary, and of the Medical Society of the District of Columbia (1887); Member of the British Medical Association; Fellow of the Gynecological Society; President of the Washington Obstetrical and Gynecological Society; Secretary American Gynecological Society, 1886–1890. *President*, 1899. 926 Farragut Square, Washington, D. C.

1901.—JOHNSON, ROBERT W., M.D. Professor of Surgery, Baltimore Medical College. Corner Franklin and Cathedral Streets, Baltimore, Md.

Founder.—JOHNSTON, GEORGE BEN, M.D. Formerly Consulting Surgeon to the Richmond Eye, Ear, and Throat Infirmary; ex-President of the Richmond Academy of Medicine and Surgery; ex-President of the Medical Society of Virginia; Member of the American Association of Obstetricians and Gynecologists, and First Vice-President, 1896; Member of the Ninth International Medical Congress; Member of the American Surgical Association; late Professor of Anatomy in the Medical College of Virginia, and now Professor of the Practice of Surgery and Clinical Surgery; Surgeon to the Old Dominion Hospital; Consulting Surgeon to the City Free Dispensary. *Vice-President*, 1892; *President*, 1897. 407 East Grace Street, Richmond, Va.

1902.—JORDAN, WILLIAM MUDD, M.D. Surgeon to St. Vincent's Hospital; Gynecologist to Hillman Hospital; formerly Assistant Surgeon, U. S. Marine Hospital Service. Birmingham, Ala.

1890.—KELLY, HOWARD ATWOOD, M.D. Founder of Kensington Hospital, Philadelphia; Associate Professor of Obstetrics, University of Pennsylvania, 1888–89; Professor of Gynecology and Obstetrics, Johns Hopkins University, 1888–99; Professor of Gynecology, Johns Hopkins University; Gynecologist-in-Chief to Johns Hopkins Hospital; Membre Associé Etrander de la Société Obstétricale et Gynecologique de Paris; Correspondirendes Mitglied der Gesellschaft f. Geburtshülfe zu Leipzig; Honorary Fellow Edinburgh Obstetrical Society, Royal Academy of Medicine (Ireland), and British Gynecological Society; Member Washington Academy of Sciences; Fellow

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American Gynecological Society. 1418 Eutaw Place, Baltimore, Md.

1899.—KOHLMAN, WILLIAM, M.D. 3500 Prytania Street, New Orleans, La.

1897.—LAIDLEY, L. H., M.D. Surgeon to the Protestant Hospital; Professor of Gynecology and Pelvic Surgery, Marion Sims-Beaumont Hospital Medical College; Member of the American Association of Obstetricians and Gynecologists. 3538 Washington Avenue, St. Louis, Mo.

1889.—LE GRAND, JOHN C., M.D. Ex-Vice-President of the American Medical Association; President of the Medical Association of the State of Alabama. 111 North Twentieth Street, Birmingham, Ala.

1894.—LEIGH SOUTHGATE, M.D., Visiting Surgeon to St. Vincent's and Norfolk Protestant Hospitals; First Vice-President Medical Society of Virginia, 1899–1900. 147 Granby St., Norfolk.

1893.—LEWIS, ERNEST S., M.D. Professor of Gynecology, Medical Department of Tulane University. *Vice-President*, 1895; *President*, 1896; *Member of Council*, 1896–1903. 124 Baronne Street, New Orleans, La.

1893.—LEWIS, HAMPTON S., M.D. 124 Baronne Street, New Orleans, La.

1900.—LLOYD, SAMUEL, M.D. Professor of Surgery, New York Post-Graduate Medical School; Attending Surgeon, Post-Graduate Hospital, and to the Babies' Wards. 24 West Fiftieth Street, New York, N. Y.

Founder.—LONG, JOHN W., M.D. Emeritus Professor of Gynecology and Pediatrics in the Medical College of Virginia; formerly Gynecologist to the Old Dominion Hospital and the Richmond City Dispensary; Consulting Surgeon to the Watts Hospital, Durham; Member, ex-Orator, and ex-Vice-President of the North Carolina Medical Society. *Vice-President*, 1902. Greensboro, N. C.

1904.—LUPTON, FRANK A., M.D. 716 North Eighteenth Street, Birmingham, Ala.

1902.—MCADORY, WELLINGTON P., M.D. Surgeon to Hillman Hospital. Birmingham, Ala.

1895.—MCGANNON, M. C., M.D. Professor of Gynecology, Medical Department, University of Nashville. 301 North Spruce Street, Nashville, Tenn.

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1893.—McGuire, Stewart, M.D. Professor of the Principles of Surgery and Clinical Surgery, University College of Medicine; Surgeon-in-Charge, St. Luke's Hospital; Visiting Surgeon, Virginia Hospital; Consulting Surgeon, Virginia Home for Incurables. 518 East Grace Street, Richmond, Va.

1891.—McGuire, W. Edward, M.D. Professor of Gynecology, University College of Medicine; Gynecologist to the Virginia Hospital. 411 East Grace Street, Richmond, Va.

1888.—McMurtry, Lewis S., M.D. President of the American Medical Association; Professor of Gynecology and Abdominal Surgery, Hospital College of Medicine, Louisville; Gynecologist to St. Mary and St. Elizabeth Hospital; Gynecologist to Gray Street Infirmary; ex-President of the American Association of Obstetricians and Gynecologists; ex-President of the Kentucky State Medical Society; Corresponding Member of the Gynecological Society of Boston; Fellow of the British Gynecological Society; Ordinary Fellow of the Edinburgh Obstetrical Society. *President*, 1891; *Member of Council*, 1892–1904. 1912 Sixth Street, Louisville, Ky.

1888.—McRae, Floyd Willcox, M.D. Professor of Gastro-intestinal, Rectal, and Clinical Surgery, Atlanta College of Physicians and Surgeons; Surgeon to Grady Hospital; ex-President Medical Association of Georgia; ex-Secretary of Section on Surgery and Anatomy, American Medical Association. *Treasurer*, 1901–1903; *President*. Peters Building, Atlanta, Ga.

1900.—MacDonald, Willis G., M.D. Professor of Surgery (Adjunct), Albany Medical College; Surgeon to Albany Hospital; Chief Surgeon of South End Dispensary, etc. 29 Eagle Street, Albany, N. Y.

1900.—Manton, Walter Porter, M.D. Professor of Clinical Gynecology and Adjunct Professor of Obstetrics, Detroit College of Medicine; Gynecologist to Harper Hospital, Eastern and Northern Asylum for the Insane; Consulting Gynecologist to St. Joseph's Retreat; Vice-President of Medical Board of the Woman's Hospital and Infants' Home. 32 Adams Avenue, Detroit, Mich.

1891.—Marcy, Henry Orlando, M.D., LL.D. Ex-President of the American Medical Association; President of the Section of Gynecology, Ninth International Medical Congress;

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late President of the American Academy of Medicine; Corresponding Member of the Medico-Chirurgical Society of Bologna, Italy; Fellow of the American Association of Obstetricians and Gynecologists. 180 Commonwealth Avenue, Boston, Mass.

1899.—MARTIN, EDMUND DENEGRE, M.D. Professor of Minor and Clinical Surgery, New Orleans Polyclinic; Visiting Surgeon to the Charity Hospital; Consulting Surgeon to the Eye, Ear, Nose, and Throat Hospital; President Orleans Parish Medical Society. 115 Chartres Street, New Orleans, La.

1904.—MASON, J. M., M.D. Alternate Surgeon to St. Vincent Hospital. 2010 Thirteenth Avenue, Birmingham, Ala.

1899.—MASTIN, WILLIAM M., M.D. Fellow of the American Surgical Association; Member of the American Association of Genitourinary Surgeons; Surgeon to the Mobile City Hospital. Joachim and Conti Streets, Mobile, Ala.

1893.—MATAS, R., M.D. Professor of Surgery, Medical Department of Tulane University; Fellow of the American Surgical Association. 624 Gravier Street, New Orleans, La.

1896.—MATTHEWS, WILLIAM P., M.D. Professor of Anatomy, Medical College of Virginia; Orthopedic Surgeon to the Old Dominion Hospital. Richmond, Va.

1902.—MAYO, CHARLES H., M.D. Attending Surgeon, St. Mary's Hospital. Rochester, Minn.

Founder.—MERIWETHER, FRANK T., M.D. Assistant Surgeon, U. S. A. (Retired). Asheville, N. C.

1899.—MICHINARD, P. E., M.D. 624 Gravier Street, New Orleans, La.

1888.—MILLER, C. JEFF., M.D. Professor of Operative Gynecology, New Orleans Polyclinic; Visiting Gynecologist to Charity Hospital. 1719 Jackson Avenue, New Orleans, La.

1899.—MILLIKEN, SAMUEL E., M.D. 449 Elm Street, Dallas, Texas.

1901.—MIXTER, SAMUEL JASON, M.D. Surgeon, Massachusetts General Hospital; Consulting Surgeon, Massachusetts Charity Eye and Ear Infirmary; Instructor of Surgery, Harvard Medical School. 180 Marlborough Street, Boston, Mass.

1904.—MORAN, JOHN F., M.D. Professor of Obstetrics, Georgetown University; Obstetrician to Georgetown University Hospital and Columbia Hospital for Women. Washington. D.C.

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1903.—Morgan, James B., M.D. Professor of Anatomy and Clinical Surgery, Medical College of Georgia; Chairman Board of Censors, Georgia Medical Association. 1272 Broad Street, Augusta, Ga.

1902.—Morris, Lewis C., M.D. Professor of Anatomy and Associate Professor of Gynecology, Birmingham Medical College; Councillor of Medical Association, State of Alabama; Vice-President of Tri-State Medical Society of Alabama, Georgia, and Tennessee. 716 North Eighteenth Street, Birmingham, Ala.

1900.—Morris, Robert Tuttle, M.D. Professor of Surgery, New York Post-Graduate Medical School and Hospital. 58 West Fifty-sixth Street, New York, N. Y.

1901.—Mullally, Lane, M.D. Demonstrator of Anatomy and Lecturer on Diseases of Children, Medical College State of South Carolina. Charleston, S. C.

1891.—Murfree, James Brickle, M.D. Professor of Surgery, University of the South (Sewanee); ex-President of the Tennessee State Medical Society, and of the Tri-State Medical Society of Alabama, Georgia, and Tennessee. Murfreesboro, Tenn.

1894.—Murphy, J. B., M.D. Professor of Surgery, Northwestern University; Professor of Surgery, Post-Graduate School and Hospital; Attending Surgeon to Cook County and Mercy Hospitals. 100 State Street, Chicago, Ill.

Founder.—Nash, Herbert Milton, M.D. Consulting Surgeon to the Retreat for the Sick (Hospital), Norfolk, Consultant to the Staff of St. Vincent's Hospital; ex-President of the Norfolk City Medical Society; Member of the State Board of Medical Examiners of Virginia. 296 Freemason Street, Norfolk, Va.

1899.—Neff, Wallace, M.D. Formerly Adjunct Professor of Clinical Surgery and Surgical Pathology, Medical College of Ohio (University of Cincinnati); late Major and Brigade Surgeon, U. S. V. 1337 K Street, Washington, D. C.

1891.—Nelson, Hugh T., M.D. Member of the Medical Examining Board of Virginia. Charlotteville, Va.

1889.—Nicolson, William Perrin, M.D. Professor of Anatomy and Clinical Surgery, Atlanta College of Physicians

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and Surgeons. *Vice-President*, 1900. Prudential Building, Altanta, Ga.

1896.—NOBLE, CHARLES P., M.D. Surgeon-in-Chief, Kensington Hospital for Women; Consulting Surgeon, Woman's Hospital; Lecturer on Gynecology, Philadelphia Polyclinic. 1500 Locust Street, Philadelphia, Pa.

1890.—NOBLE, GEORGE H., M.D. Ex-President of the Georgia Medical Association; ex-Secretary of Obstetrical Section of the American Medical Association. *Vice-President*, 1901. 131 South Pryor Street, Atlanta, Ga.

1903.—NOLEN, WILLIAM L., M.D. Visiting Surgeon, Erlanger Hospital; President Chattanooga Medical Society. Loveman Building, Chattanooga, Tenn.

1890.—NUNN, R. J., M.D. Savannah, Ga.

1902.—O'BRIEN, MATTHEW WATSON, M.D. Surgeon Southern, and Chesapeake and Ohio Railways; Member of the American Association for the Advancement of Science. 908 Cameron Street, Alexandria, Va.

1901.—OCHSNER, A. J., M.D. Adjunct Professor of Clinical Surgery, College of Physicians and Surgeons; Surgeon-in-Chief Augustana and St. Mary's Hospital. 710 Sedgwick Street, Chicago, Ill.

1903.—OCHSNER, EDWARD H., M.D. Surgeon to Augustana and St. Mary's Hospital. 710 Sedgwick Street, Chicago, Ill.

1904.—OECHSNER, JOHN F., M.D. Professor of Orthopedics, New Orleans Polyclinic; Assistant Demonstrator of Anatomy, Tulane University; Visiting Surgeon, Charity Hospital; 124 Baronne Street, New Orleans, La.

1902.—OLIVER, JOHN CHADWICK, M.D. Dean and Professor of Operative Surgery, Miami Medical College; Surgeon to the Cincinnati, Christ, and Presbyterian Hospitals. 628 Elm Street, Cincinnati, Ohio.

1902.—OVIATT, CHARLES W., M.D. Formerly Professor of Surgery in Milwaukee Medical College; Attending Surgeon St. Mary's Hospital. Oshkosh, Wis.

Founder.—PAINE, JOHN FANNIN YOUNG, M.D. Professor of Obstetrics and Gynecology in the Medical Department, University of Texas; Gynecologist and Obstetrician, John Sealy Hospital; Fellow of the American Association of Obstetricians and Gynecologists; ex-President of the Texas Medical

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Association; Fellow of the Texas Academy of Science. 2177 Market Street, Galveston, Texas.

1888.—PARHAM, F. W., M.D. Professor of Surgery in the New Orleans Polyclinic. *Vice-President*, 1899. 1429 Seventh Street, New Orleans, La.

1900.—PARK, ROSWELL, M.D. Professor of Surgery, Medical Department, University of Buffalo; Surgeon, Buffalo General Hospital; Member German Congress of Surgeons, Italian Surgical Society, American Surgical Association, American Orthopedic, and American Genitourinary Associations. 510 Delaware Avenue, Buffalo, N. Y.

1893.—PARKER, WILLIAM E., M.D. Formerly Visiting Surgeon to the Charity Hospital of New Orleans. *Vice-President*, 1897. Dugan-Stuart Building, Hot Springs, Ark.

1899.—PERKINS, W. M., M.D. Chief of the Clinic Chair of General Clinical and Operative Surgery, New Orleans Polyclinic; Assistant Demonstrator of Operative Surgery, Medical Department, Tulane University of Louisiana; Visiting Surgeon to the Charity Hospital. 211 Camp Street, New Orleans, La.

1904.—PETERS, J. U. W., M.D. Surgeon to St. Vincent Hospital. Birmingham, Ala.

1899.—PLATT, WALTER BREWSTER, M.D. Surgeon to the Robert Garrett Hospital for Children. 802 Cathedral Street, Baltimore, Md.

1889.—POLK, WILLIAM M., M.D. Dean and Professor of Obstetrics and Gynecology, Cornell University Medical College; Gynecologist to Bellevue Hospital; Consulting Surgeon to St. Luke's, St. Vincent's, New York Lying-in, and Trinity Hospitals; ex-President of American Gynecological Society, and New York Obstetrical Society. 7 East Thirty-sixth Street, New York.

1900.—PORTER, MILES F., M.D. Trustee of American Medical Association. 47 West Wayne Street., Fort Wayne, Ind.

1889.—POTTER WILLIAM WARREN, M.D. Consulting Gynecologist to the Woman's Hospital; Consulting Surgeon to the Buffalo General Hospital; President and Examiner in Obstetrics, New York State Medical Examining and Licensing Board; Chairman of Section of Obstetrics and Diseases of Women, American Medical Association, 1890; President of the Buffalo Obstetrical Society, 1884–1886; President of the Medical Society

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of the State of New York, 1891; Executive President of the Section of Gynecology and Abdominal Surgery, Pan-American Medical College, 1893. 284 Franklin Street, Buffalo, N. Y.

1889.—PRICE, JOSEPH, M.D. Physician-in-Charge of the Obstetrical and Gynecolgical Department of the Philadelphia Dispensary; Fellow of the American Association of Obstetricians and Gynecologists; ex-Chairman, Section of Diseases of Women and Obstetrics, American Medical Association. *Vice-President*, 1893. 241 North Eighteenth Street, Philadelphia, Pa.

1900.—*PRYOR, WILLIAM RICE, M.D.

1899.—QUINN, W. A., M.D. Henderson, Ky.

1900.—RANSOHOFF, JOSEPH, M.D., F.R.C.S. Professor of Anatomy and Clinical Surgery, Medical College of Ohio; Surgeon to Cincinnati, Good Samaritan, and Jewish Hospitals; Member American Surgical Association. 706 Walnut Street, Cincinnati, Ohio.

1890.—REED, CHARLES ALFRED LEE, M.D. Ex-President of the American Medical Association; Professor of Gynecology and Abdominal Surgery in the Cincinnati College of Medicine and Surgery; Surgeon to the Cincinnati Free Hospital for Women; Fellow of the American Association of Obstetricians and Gynecologists; Fellow of the British Gynecological Society; ex-Chairman of the Section on Obstetrics and Diseases of Women of the American Medical Association; Secretary-General of the Pan-American Medical Congress, 1893; Honorary Member of the Medical Society of the State of New York. Corner Seventh and Race Streets, Cincinnati, Ohio.

1900.—REES, CHARLES MAYRANT, M.D. Professor of Abdominal Surgery and Gynecology, Charleston Medical School; Abdominal Surgery and Gynecology, City Hospital; Gynecologist to Shirro's Dispensary. Charleston, S. C.

1899.—RICHARDSON, MAURICE HOWE, M.D. Visiting Surgeon to the Massachusetts General Hospital; Assistant Professor of Clinical Surgery, Harvard Medical School. 224 Beacon Street, Boston, Mass.

1901.—RICKETTS, EDWIN, M.D. Professor of Abdominal Surgery and Gynecology at the Cincinnati Polyclinic; Member

* Deceased.

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of the American and British Medical Associations; ex-President of the American Association of Obstetricians and Gynecologists. 415 Broadway, Cincinnati, Ohio.

1888.—ROBERTS, WILLIAM O., M.D. Professor of Principles of Surgery and Clinical Surgery; Medical Department of the University of Louisville; formerly Secretary of the Surgical Section of the American Medical Association. *Vice-President*, 1889. 1520 Third Street, Louisville, Ky.

1901.—ROBINS, CHARLES RUSSELL, M.D. Lecturer on Gynecology, Instructor in Gynecology and Abdominal Surgery, Attending Obstetrician, Outside Obstetrical Department, Medical College of Virginia; Local Surgeon, Atlantic Coast Line Railroad. 17 North Fifth Street, Richmond, Va.

1889.—ROBINSON, WILLIAM LOVAILLE, M.D. Fellow of the American Association of Obstetricians and Gynecologists; ex-President of the Danville Medical Society; Member of the Medical Examining Board of Virginia; ex-President of Virginia Medical Society. *Vice-President*, 1899. 753 Main Street. Danville, Va.

1901.—ROGERS, MACK, M.D. Professor of Anatomy, Birmingham Medical College. 212 Twentieth Street, Birmingham, Ala.

1901.—ROSSER, CHARLES M., M.D. Professor of Nervous and Mental Diseases and Clinical Surgery, Baylor University College of Medicine; Consulting Surgeon, Parkland Hospital; Attending Surgeon, Texas Baptist Memorial Sanitarium; ex-President Texas State Medical Association. *Treasurer*. Linz Building, Dallas, Texas.

1890.—ROYSTER, HUBERT A., A.B., M.D. Professor of Gynecology and Dean of the Faculty, Medical Department, University of North Carolina; Gynecologist to Rex Hospital; Surgeon-in-Chief, St. Agnes' Hospital; Surgeon, Southern Railway. Tucker Building, Raleigh, N. C.

1901.—RUNYAN, JOSEPH P., M.D. 203 West Second Street, Little Rock, Ark.

1893.—SAUNDERS, BACON, M.D. Professor of Surgery and Clinical Surgery and Dean of Faculty of Medical Department, Fort Worth University; Chief Surgeon Fort Worth and Denver City Railway; ex-President Texas State Medical Association. *Vice-President*, 1903. Ninth and Houston Streets, Fort Worth, Texas,

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Founder.—SCHILLING, NICHOLAS, M.D. Cedar Bayou, Texas.

1899.—SHANDS, A. R., M.D. Professor of Orthopedic Surgery, Columbian University. 1328 New York Avenue, N. W., Washington, D. C.

1902.—SHERRILL, J. GARLAND, M.D. Professor of Surgery and Clinical Surgery, Kentucky University; Consulting Surgeon to Louisville Hospital. 633 St. Charles Place, Louisville, Ky.

Founder.—SHIVERS, OFFA LUNDSFORD, M.D. Councillor of the Alabama Medical Association. Marion, Ala.

1893.—SIMONS, MANNING, M.D. Professor of Clinical Surgery, Medical College, State of South Carolina; Surgeon to St. Francis Xavier's Infirmary; Surgeon to City Hospital; ex-President Medical Society of South Carolina; President of the South Carolina Medical Association; Member American Association of Obstetricians and Gynecologists; ex-Vice-President Tri-State Medical Society of Virginia and the Carolinas. *Vice-President*, 1895 and 1900; *President*, 1901. 111 Church Street, Charleston, S. C.

1900.—SIMPSON, FRANK FARROW, M.D. Assistant Gynecologist to Mercy Hospital; Gynecologist to Out-patient Department, Mercy Hospital. 524 Pennsylvania Avenue, Pittsburgh, Pa.

1894.—SMITH, REGINALD K., M.D. Surgeon U. S. Navy. 2600 Jackson Street, San Francisco, Cal.

1899.—SMYTHE, FRANK DAVIE, M.D. Surgeon to St. Joseph's Hospital; Assistant Professor of Surgery, Memphis Hospital Medical College; Demonstrator of Operative Surgery; formerly Member of the State Board of Examiners of Mississippi. Porter Building, Memphis, Tenn.

Founder.—SOUCHON, EDMOND, M.D. Professor of Anatomy and Clinical Surgery, Medical Department of Tulane University; Member of the American Surgical Association; President Louisiana State Board of Health. 135 Baronne Street, New Orleans, La.

1904.—STOKES, JAMES ERNEST, M.D. Salisbury, N. C.

Founder.—STONE, ISAAC SCOTT, M.D. Clinical Professor Gynecology, Georgetown University; Gynecologist to Columbia Hospital, and Associate Gynecologist to Georgetown University

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Hospital; Member American and British Gynecological Societies; Honorary Fellow of Medical Society of the State of New York; Fellow of the Medical Society of Virginia; Member Washington Academy of Sciences; Washington Obstetrical and Gynecological Society. 1618 Rhode Island Avenue, N.W. Washington, D. C.

1894.—TALLEY, D. F., M.D. Ex-President of the Jefferson County Medical Society; Professor of Materia Medica and Lecturer on Surgery, Birmingham Medical College. Birmingham, Ala.

1902.—TATE, MAGNUS, A., M.D. Lecturer on Anatomy of the Female Pelvic Viscera and Embryology, Miami Medical College; Assistant Gynecologist to St. Mary's Hospital; Consulting Obstetrician to Speer's Hospital; Member American Association of Obstetricians and Gynecologists. Third and Broadway, Cincinnati, O.

Founder.—TAYLOR, BENJAMIN W., M.D. Ex-President of Columbia Medical Society and of South Carolina State Medical Association; Chief Surgeon Columbia Hospital; President of Board of Regents, South Carolina Hospital for the Insane; Consulting Surgeon South Carolina Hospital for the Insane; ex-Member of State Board of Medical Examiners. 1409 Plain Street, Columbia, S. C.

Founder.—TAYLOR, HUGH M., M.D. Professor of Practice of Surgery and Clinical Surgery, University College of Medicine; Surgeon to the Virginia Hospital; ex-President of the Virginia Board of Medical Examiners. 6 North Fifth Street, Richmond, Va.

1898.—TAYLOR, WILLIAM WOOD, A.B., M.D. Gynecologist to St. Joseph's and the Memphis City Hospitals. 246 Randolph Building, Memphis, Tenn.

1892.—THOMPSON, J. E., M.D. Professor of Surgery in the University of Texas. Galveston, Texas.

1891.—TIFFANY, LOUIS MCLANE, M.D. Professor of Surgery in the University of Maryland; Fellow of the American Surgical Association. *President*, 1895. 831 Park Avenue, Baltimore, Md.

1890.—TOMPKINS, CHRISTOPHER, M.D. Professor of Obstetrics in the Medical College of Virginia. *Vice-President*, 1903. 116 East Franklin Street, Richmond, Va.

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1888.—TUHOLSKE, HERMAN, M.D. Professor of Surgery, Medical Department, Washington University; Consulting Surgeon, St. Louis City Hospital; Surgeon to St. Louis Polyclinic Hospital, etc. 410 North Jefferson Street, St. Louis, Mo.

1893.—VANDER VEER, ALBERT, M.D. Professor of Clinical, Didactic, and Abdominal Surgery, Albany Medical College; Fellow of the American Surgical Association; ex-President of the American Association of Obstetricians and Gynecolgists; ex-President of the Medical Society of the State of New York. 28 Eagle Street, Albany, N. Y.

1891.—WALKER, EDWIN, M.D., Ph.D. Gynecologist to the Evansville City Hospital; ex-President Mississippi Valley Medical Association; President of the Indiana State Medical Society; Fellow of the American Association of Obstetricians and Gynecologists. 712 Upper Fourth Street, Evansville, Ind.

1898.—WATKINS, ISAAC LAFAYETTE, M.D. President of the Montgomery County Medical and Surgical Society. Montgomery, Ala.

1901.—WERDER, X. O., M.D. Gynecologist, Mercy Hospital, Pittsburgh; Professor of Gynecology, West Pennsylvania Medical College; Consulting Surgeon to the South Side Hospital, Allegheny General Hospital, St. Francis' Hospital, etc. 524 Pennsylvania Avenue, Pittsburgh, Pa.

1888.—WESTMORELAND, WILLIS F., M.D. Professor of Surgery, Atlanta College of Physicians and Surgeons. 241 Equitable Building, Atlanta, Ga.

1904.—WHALEY, T. P., M.D. Lecturer Genito-Urinary and Renal Surgery, Charleston Medical School; Lecturer Diseases of Skin, Medical College of the State of South Carolina; Surgeon to Sherra's Dispensary; Visiting Surgeon, Charleston City Hospital. 113 Wentworth Street, Charleston, S. C.

1902.—WHITACRE, HORACE J., M.D., B.S. Professor of Pathology and Surgeon to Clinics, Medical Department, University of Cincinnati; Surgeon to Christ Hospital; Consulting Surgeon to Speer's Hospital; President Cincinnati Research Society; Assistant Pathologist Cincinnati Hospital; Surgeon to Norfolk and Western R. R. 831 Union Trust Building, Cincinnati, O.

1900.—WILLIAMS, ENNION G., M.D. 315 East Grace Street, Richmond, Va.

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1900.—Williams, Howard J., A.B., A.M., M.D. Surgeon to Macon Hospital; ex-President of the Medical Association of Georgia, etc. 550 Orange Street, Macon, Ga.

1900.—Williams, J. Whitridge, A.B., M.D. Professor of Obstetrics, Johns Hokpins University; Pathologist to Woman's Hospital of Maryland. 845 Park Avenue, Baltimore, Md.

Founder.—Wilson, J. T., M.D. Ex-President of the North Texas Medical Association; President of the Texas Medical Association; Superintendent of the State Hospital for the Insane. *Vice-President,* 1891. Sherman, Texas.

1891.—Wyeth, John Allen, M.D. Ex-President of the American Medical Association (1901). Professor of Surgery in the New York Polyclinic; Consulting Surgeon to St. Elizabeth's Hospital; Visiting Surgeon to Mt. Sinai Hospital and Polyclinic Hospital; Honorary member of the Texas State Medical Association; President of the New York State Medical Association; ex-President of the New York Pathological Society. 19 West Thirty-fifth Street, New York, N. Y.

1900.—Wysor, John C., M.D. Surgeon-in-Charge, C. & O. Hospital. Clifton Forge, Va.

1900.—Young, Hugh H., M.D. Chief of Clinic, Genito-Urinary Surgery, Johns Hopkins Hospital. 1005 North Charles Street, Baltimore, Md.

1902.—Zinke, E. Gustav, M.D. Professor of Obstetrics in Medical College of Ohio; Obstetrician and Gynecologist German Protestant Hospital; Attending Obstetrician to Ohio Maternity; Fellow of American Association of Obstetricians and Gynecologists. 13 Garfield Place, Cincinnati, O.

Total, 189 Active Members.

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CONSTITUTION.

ARTICLE I.

The name of this Association shall be THE SOUTHERN SURGICAL AND GYNECOLOGICAL ASSOCIATION.

ARTICLE II.

The object of this Association is to further the study and practice of surgery and gynecology among the profession of the Southern States.

ARTICLE III.

This Association shall adopt and conform to the Code of Ethics of the American Medical Association.

ARTICLE IV.

SECTION 1. Any reputable physician who practises surgery or gynecology, and who is vouched for by two members of the Association and recommended by the Council, shall be eligible to membership in this body.

SEC. 2. The honorary members shall not exceed ten in number, and shall enjoy all the privileges of other members, excepting to vote or hold office, but shall not be required to pay any fee.

ARTICLE V.

SECTION 1. The officers of this Association shall be a President, two Vice-Presidents, a Secretary, a Treasurer, and a Council, elected by ballot.

SEC. 2. The President and Vice-Presidents shall be elected for one year, and the President shall not be eligible for re-election at any time; the Secretary and Treasurer, each, for five years; and the Council as provided for in the By-laws.

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ARTICLE VI.

SECTION 1. It shall be the duty of the President to preside at all meetings of the Association; to give the casting vote; to see that the rules of order and decorum be properly enforced in all deliberations of the Association; to sign the approved proceedings of each meeting, and to approve such orders as may be drawn upon the Treasurer for expenditures ordered by the Association.

SEC. 2. In the absence of the President the first Vice-President shall preside, and in his absence the second Vice-President shall preside.

SEC. 3. In the absence of all three, the Association shall elect one of its members to preside *pro tem.*

SEC. 4. It shall be the duty of the Secretary to keep a true and correct record of the proceedings of the meetings; to preserve all books, papers, and articles belonging to the archives of the Association; to attest all orders drawn on the Treasurer for moneys appropriated by the Association; to keep the account of the Association with its members; to keep a register of the members, with the dates of their admission and places of residence. He shall collect all moneys due from the members and pay to the Treasurer, taking his receipt for the same. He shall report such unfinished business of previous meetings as may appear on his books requiring action, and attend to such other business as the Association may direct. He shall also supervise and conduct all the correspondence of the Association, and edit the TRANSACTIONS under the direction of the Council.

SEC. 5. It shall be the duty of the Treasurer to keep a correct record of all moneys received from the hands of the Secretary, giving his receipt for the same; pay them out by order of the Association as indorsed by the President and attested by the seal in the hands of the Secretary.

SEC. 6. It shall be the duty of the President of the Association to appoint an Auditing Committee, consisting of three members of the Association, whose duty it shall be to examine the books of the Secretary and Treasurer, and report on the same on the last day of the session.

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ARTICLE VII.

Vacancies occurring in the offices of the Association shall be filled by appointment of the President until the next meeting. He shall also have the appointment of all committees not otherwise provided for.

ARTICLE VIII.

This Constitution shall take effect immediately from the time of its adoption, and shall not be amended except by a written resolution, which shall lie over one year, and receive a vote of two-thirds of the members present.

ARTICLE IX.

Any member who for three consecutive years fails to attend the meetings shall be dropped from the roll of membership.

ARTICLE X.

The membership of the Association shall be limited to two hundred.

ARTICLE XI.

All members who have been in continuous membership for twenty years and have attended fifty per cent. of the meetings shall become life members and be exempt from dues.

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BY-LAWS.

ARTICLE I.

The Southern Surgical and Gynecological Association shall meet annually on the second Tuesday of November at 10 A.M., at such place as may be designated by the preceding meeting.

ARTICLE II.

The members present shall constitute a quorum for business.

ARTICLE III.

The annual dues of each member shall be $10, paid in advance.

ARTICLE IV.

The usual parliamentary rules governing deliberative bodies shall govern the business workings of this Association.

ARTICLE V.

All questions before the Association shall be determined by a majority of the votes present.

ARTICLE VI.

The President shall deliver an annual address at each meeting of the Association.

ARTICLE VII.

The Secretary of the Association shall receive, at each annual Session, a draft from the President, drawn on the Treasurer, for the sum of $500 for services rendered the Association, and to this shall be added the necessary expense incurred in the discharge of his official duties.

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ARTICLE VIII.

It shall be the duty of the Secretary, one month prior to the annual meeting, to notify the members of the Association, and urge their attendance.

ARTICLE IX.

The authors of papers shall notify the Secretary, six weeks prior to the meeting, of the titles of their essays, so that they may be incorporated in the preliminary programme.

ARTICLE X.

COUNCIL.

The Council shall consist of five members; and of those elected at the primary meeting, the first shall serve five years, the second four, the third three, the fourth two, and the fifth one year; so that subsequently one member of the Council shall be elected annually to serve five years. The President and Secretary shall be *ex-officio* members of the Council.

This Council shall organize by electing a Chairman and Secretary, and shall keep a record of its proceedings.

The duties of this Council shall be—

1. To investigate applications for membership and report to the Association the names of such persons as are deemed worthy.

2. To take cognizance of all questions of an ethical, judicial, or personal nature, and upon these the decision of the Council shall be final; *provided*, that appeal may be taken from such decision of the Council to the Association, under a written protest, which protest shall be sustained by the Association, and the matter shall then be referred to a special committee, with power to take final action.

3. All motions and resolutions before the Association shall be referred to the Council without debate, and it shall report by recommendation at as early an hour as possible.

ARTICLE XI.

The President shall appoint at each annual meeting a Committee of Arrangements.

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ARTICLE XII.

The Council shall have full power to omit from the published TRANSACTIONS, in part or in whole, any paper that may be referred to it by the Association, unless specially instructed to the contrary by the Association, which will be determined by vote.

ARTICLE XIII.

Any member failing to pay his dues for more than one year shall be dropped.

ARTICLE XIV.

No paper shall be read before this Association which does not deal strictly with a subject of surgical or gynecological importance.

ARTICLE XV.

No paper read before the Association shall be published in any medical journal or pamphlet for circulation, as having been read before the Association, without having received the indorsement of the Council.

ARTICLE XVI.

The reading of papers shall be limited to twenty minutes each, except by permission of the Association.

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MINUTES OF THE PROCEEDINGS

AT THE

SEVENTEENTH ANNUAL MEETING

OF

THE SOUTHERN

SURGICAL AND GYNECOLOGICAL

ASSOCIATION,

HELD IN THE

COUNCIL CHAMBER OF THE CITY HALL,

Birmingham, Alabama,

DECEMBER 13, 14 AND 15, 1904.

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SEVENTEENTH ANNUAL MEETING.

FIRST DAY.—*Tuesday, December* 13, 1904.

Letters and messages of regret were received from a number of Fellows who were unable to attend the meeting.

Morning Session.—The Association met in the Council Chamber of the City Hall, and was called to order at 9.45 A.M. by the Second Vice-President, Dr. J. Shelton Horsley, of Richmond, Virginia, in the absence of the President (Dr. Floyd W. McRae), on account of sickness.

Prayer was offered by Rev. A. C. Davidson, D.D., pastor of the South Side Baptist Church, after which Mayor W. M. Drennan was introduced and delivered the following

ADDRESS OF WELCOME.

Mr. President and Members of the Southern Surgical and Gynecological Association: Birmingham feels honored to welcome you here for the third time, and for the especial reason that your Association was organized in this city almost eighteen years ago.

I note that you have changed your name from the Alabama Surgical and Gynecological Association to the Southern Surgical and Gynecological Association, and I assume that you have done so to include in your membership eminent surgeons and specialists from other States.

The need for specialism has grown so rapidly during the past few years that it has become necessary for the young man who expects to make his mark in this world, it matters not whether it be as farmer, mechanic, merchant, manufacturer, physician, or surgeon, to make a specific study of the avocation or profession which he expects to follow through life.

The organization which you gentlemen so eminently and ably represent has met here this morning not only to be benefited individually and collectively, but that humanity may be benefited as well.

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I trust that the local members of your Association have arranged, in making up the program, that all of your time will not be taken in the discussion of papers which will come before you. I hope the program has been so adjusted that you will be enabled not only to meet and comingle with the members of your profession, but with the citizens of this city as well, in order that we may show you the appreciation and high esteem in which your profession is held by the people of Birmingham.

Ours is a great and growing city. The very spot on which this City Hall stands was a cotton field less than thirty-two years ago, and the city was incorporated less than that number of years ago. We have six trunk lines now, and the coal and iron that move in and out of this city have a greater monetary value than the entire wheat crop of the Northwestern States, and is worth four times more than the cotton crop of the Southern States. In the city of Birmingham in the last three years more than 6000 houses have been built, at a total cost of something over $10,000,000.

We have a street-car system with over 100 miles of track, ranking third in point of mileage in the South, and serving a population of almost 200,000.

While we have made great progress in mining and manufacturing and in developing along other lines, we have not forgotten to build magnificent churches and hospitals, and private sanitariums as well.

We are glad to have you here this morning. Your program may not give you time in which to see our city and district, but we hope that many of you will remain after the adjournment of the Association and become better acquainted with us.

Again, Mr. President, in behalf of the city of Birmingham, I extend to you a hearty welcome. (Applause.)

Dr. L. G. Woodson was then introduced and delivered an address of welcome on behalf of the local medical profession.

ADDRESS OF WELCOME BY DR. WOODSON.

Mr. President and Gentlemen of the Southern Surgical and Gynecological Association: An ordinary husbandman, standing upon the threshold of his humble cottage, and casting his vision over the smiling landscape before him, is able to survey

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with critical precision the various features which it presents. But transplant him to the base of some majestic mountain, lifting its head in sovereign grandeur amidst the heavens, and so bewildered will his vision become by the very magnificence and immensity of the view, that nothing is observed but its salient outlines. It is thus that I feel to-day in attempting to extend to your august Association a welcome which shall be in keeping with the exalted position which you occupy in the medical and surgical world.

To speak for a city such as ours, and to welcome an organization such as yours, would be an honor to any man. We welcome you, for the same reason that any city would be proud to welcome you, because you are men whose names are famous, whose achievements are known, whose presence is an honor, and we welcome you because you are here to honor the memory of one whose name is dear to us—the distinguished and lamented Dr. William Elias Brownlee Davis.

It is most fitting that the tribute which you propose paying him should be paid here—for Birmingham is the birthplace of your Association. Birmingham, whose age might almost be counted in months, unknown a few years ago, stands to-day among the cities of the South, scarcely a pace behind New Orleans, whose people point with pride to their past of hundreds of years. A quarter of a century ago the city of Birmingham was known to few save those unfortunates whose miserable lot was cast in her deserted streets. To-day I am sure she needs no introduction to such men as yourselves. She has not the beauty of some cities, for smoke, soot, and dust have discolored her buildings and soiled her streets. But it is not the grime of ages, allowed to settle through long years of sloth and inactivity —it is the smoke and soot of progress and prosperity.

We have many things to be proud of, not the least among which is our right to claim the honor belonging to this city as the birthplace of the Southern Surgical and Gynecological Association, and the home of its founder. The organization of the Alabama Surgical and Gynecological Association in this city in 1886 was the work of Dr. Davis. With rare insight and intelligence, he foresaw the usefulness of such an organization. At its first annual meeting in 1887 it was found that the field was so broad, the possibilities so vast, that it could be confined to no

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one State. Therefore, at that meeting it was decided to extend invitations of membership to the leading surgeons and gynecologists in the South, and the name of the Association was changed to that which it now bears. But even then the magnitude of the project demanded wider scope. It soon became evident that there must be no sectionalism, for South, East, and West are to-day represented, and the Association, as it now stands, is the peer of any similar organization in the world.

At its birth, like all great movements, it met with opposition and discouragement. Few believed that the combination of surgeons and gynecologists would prove of benefit to either one or the other. But the prophetic soul of the indomitable Davis had faith in it; he was able to see beyond the present to the wider promise of the future, and the splendid fulfilment has amply justified the wisdom of his hopes. Your magnificent Association is a greater and more lasting monument to his memory than the statue of bronze which you will to-morrow unveil. The old aphorism that "a prophet is never without honor save in his own country" does not apply to our distinguished dead. He did not have to seek fame and fortune in a foreign land. But in this city, within a stone's throw of the place of his birth, we find him stepping almost without an interval from comparative obscurity to the most honored and exalted position which the greatest and most scientific of all professions could bestow.

But, alas! Quenched forever in endless night is the blaze of that genius which, during its short but brilliant career, cast its meteoric splendors, like a flash of glory, across the startled horizon of the medical world. All that remains of him now which time can destroy is clasped in the frozen embrace of death, among the people he loved so well, and thither should the devout of every clime and nation repair to inhale the inspiring atmosphere that floats over his tomb.

> "For graves like his are pilgrim shrines,
> Shrines of no creed or code confined,
> The Delphian Groves, the Palestines,
> The Meccas of the Mind!"

(Applause.)

Dr. William P. Nicolson, of Atlanta, Georgia, was asked to respond to the addresses of welcome.

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RESPONSE BY DR. NICOLSON.

Mr. Mayor and Gentlemen: This sudden and delightful surprise which was tendered to me about five minutes ago by our esteemed presiding officer finds me illy prepared to respond as I should to these beautiful addresses of welcome.

The arrival of surgeons is seldom welcomed, except upon such occasions as these, when they come to work with their tongues and not with their hands.

I am sure that every member of this Association feels that there is no place to which he can turn that has more interest than the city of Birmingham. As we have learned from your distinguished Mayor, I know of no instance where the age of the mother and the child ranks so nearly the same, as the mother which gave us origin eighteen years ago is only thirty-two years of age.

We all recognize Birmingham as a great city, and I am very sorry that I hail from a city which is so modest that it never proclaims its own efforts to the world, the city of Atlanta being recognized as the most modest of all cities in this portion of the land. (Laughter.)

The only difference between the Southern Surgical and Gynecological Association and the city of Birmingham as regards their size and growth is that ours is limited, while the growth of Birmingham is utterly unlimited as far as we can observe.

In coming to Birmingham we feel that we are returning, as has been so beautifully expressed, not only for our own benefit, but to pay tribute to him whose head and hand did so much for the formation of this Association, and I wish that I were in any way able to express as I should my feelings upon this subject.

Speaking of the social part of this meeting, there is perhaps no body in this country which ranks with the Southern Surgical and Gynecological Association for absolute and strict attention to the business which brings them together, and it has always been a part of their creed that social functions, no matter how tempting, shall not interfere with the distinctive purpose for which they are gathered together. It has earned and deserved the reputation of being the most businesslike body in carrying out its program that exists in this whole country.

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But it will be a pleasure, I know, for the members of this organization to mingle with the citizens of Birmingham, and to view this great and ever-growing city, which must, by the mere force of circumstances, be the greatest city in the Southern States, unless, perhaps, it be the city of Atlanta, whose modesty I have just spoken of. (Laughter.) Birmingham must be, from force of circumstances, the greatest city in the Southern States after a while.

So, in these few words, I desire to express on the part of the Association our appreciation of the high and hearty welcome which has been extended to us by the city, and to say that we will carry away pleasing memories, and hope that you will invite us to come back to Birmingham again. (Applause.)

REPORT OF THE COMMITTEE OF ARRANGEMENTS.

Dr. John D. S. Davis, Chairman of the Local Committee of Arrangements, said the Committee had made provision for the Council Chamber of the City Hall in which to hold the sessions. To-day (Tuesday), there would be a luncheon given at the Century Club. To-morrow (Wednesday), after the unveiling exercises at Capitol Park, there would be a luncheon given at the Hillman Hotel. In the evening a banquet would be given to the members and guests at the Hillman Hotel. Ladies accompanying the members would be received and entertained by the wives and daughters of the local members.

On motion, the report of the Committee of Arrangements was adopted.

Papers were then read as follows:

1. "A Method of Uniting Intestines of Very Small or Unequal Calibre," by Dr. J. Shelton Horsley, of Richmond, Virginia.

Discussed by Drs. Carr, Boldt, Finney, Dudley, Martin, Goldsmith, Mixter, and the discussion closed by the essayist.

2. "Intestinal Obstruction," by Dr. Dyer F. Talley, of Birmingham, Alabama, which was discussed by Drs. Hunner, Carr, Sherrill, Bonifield, Roberts, Parker, Nicolson, Mixter Dudley, and, in closing, by the essayist

The Secretary read a telegram from President McRae, stating that he was unable to attend the meeting on account of illness.

On motion of Dr. Rosser, the Secretary was instructed to

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answer the telegram and to express the sympathy of the members on account of his illness, and the regret of his absence.

3. "A Review of One Thousand Operations for Gall-bladder Disease, with Especial Reference to Mortality," by Dr. Charles H. Mayo, of Rochester, Minnesota, and Dr. William J. Mayo, of Rochester, Minnesota. (Read by Dr. Charles H. Mayo.)

Discussed by Drs. Haggard, Hall, Milliken, Finney, and the discussion closed by the essayist.

On motion, the Association adjourned until 2.30 P.M.

Afternoon Session.—The Association reassembled at 3.40 P.M., and was called to order by the Second Vice-President.

4. "Enterostomy," by Dr. J. W. Long, of Greensboro, North Carolina.

Discussed by Drs. Goggans, Sherrill, Stone, and, in closing, by the essayist.

The President appointed as an Auditing Committee Drs. L. C. Bosher, E. Denegre Martin, and W. O. Roberts.

The President also appointed as members of the Council to fill the places of absentees Drs. Joseph Taber Johnson and R. E. Fort.

5. "Abuse of Purgatives Before and After Abdominal Section," by Dr. I. S. Stone, of Washington, D. C.

6. "A Review of the Treatment Immediately Before and After Abdominal Section," by Dr. L. S. McMurtry, of Louisville, Kentucky.

These two papers were discussed jointly by Drs. Boldt, Carr, Mayo, Bonifield, Craig, Brown, Horsley, Roberts, Martin, and, in closing, by the essayists.

7. "The Employment of Celluloid Plates for Covering Defects in the Skull Following Operation for Epilepsy, Brain Tumor, etc.," by Dr. William Perrin Nicolson, of Atlanta, Georgia.

Discussed by Drs. Oliver, Carr, Horsley, and, in closing, by the essayist.

On motion, the Association adjourned until 8 P.M.

Evening Session.—The Association reassembled at 8 P.M., and was called to order by the Second Vice-President.

8. "Traumatic Synovitis of the Knee-joint," by Dr. Edward A. Balloch, of Washington, D. C.

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Discussed by Drs. Martin, Simons, Carr, Parker, and, in closing, by the essayist.

9. "Cases in which Early Diagnosis of Cancer of the Body of the Uterus was Made," by Dr. Rufus B. Hall, of Cincinnati, Ohio.

Discussed by Drs. Boldt, Earnest, Johnson, Balloch, Williams, Dudley, and the discussion closed by the essayist.

10. "A Contribution to the Origin of Adenomyoma of the Uterus," by Dr. J. Whitridge Williams, of Baltimore, Maryland.

Discussed by Dr. Hunner.

11. "Fibroid Degeneration of the Uterus After Ablation of the Appendages," by Dr. J. Wesley, Bovée, of Washington, D. C.

Discussed by Dr. Williams, and, in closing, by the essayist.

12. "The Effects of Suspensio-uteri on Subsequent Pregnancy and Labor," by Dr. Joseph Taber Johnson, of Washington, D. C.

Discussed by Drs. Williams, Stone, Hall, Bovée, Hill, Hunner, McGuire, Long, Dudley, Boldt, and the discussion closed by Dr. Johnson.

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On motion, the Association then adjourned until Wednesday morning.

SECOND DAY.—*Wednesday, December* 14, 1904.

Morning Session.—The Association met at 9.30 A.M., with the Second Vice-President in the Chair.

13. "Typhoid Fever and Appendicitis," by Dr. John C. Oliver, of Cincinnati, Ohio.

Discussed by Drs. Caldwell, Coley, Gaston, Murphy, and the discussion closed by Dr. Oliver.

14. "Gynecological Problems of Twenty-five Years Ago and To-day," by Dr. P. F. Chambers, of New York City.

Discussed by Drs. Dudley, Boldt, Carr, Murphy, and, in closing, by the essayist.

The Secretary read a letter from President McRae, which was directed to Drs. Brown and Horsley, the First and Second Vice-Presidents, stating his inability to be present on account of illness.

The Association adjourned at this juncture, and repaired in a body to Capitol Park, to attend the unveiling of the Davis monument.

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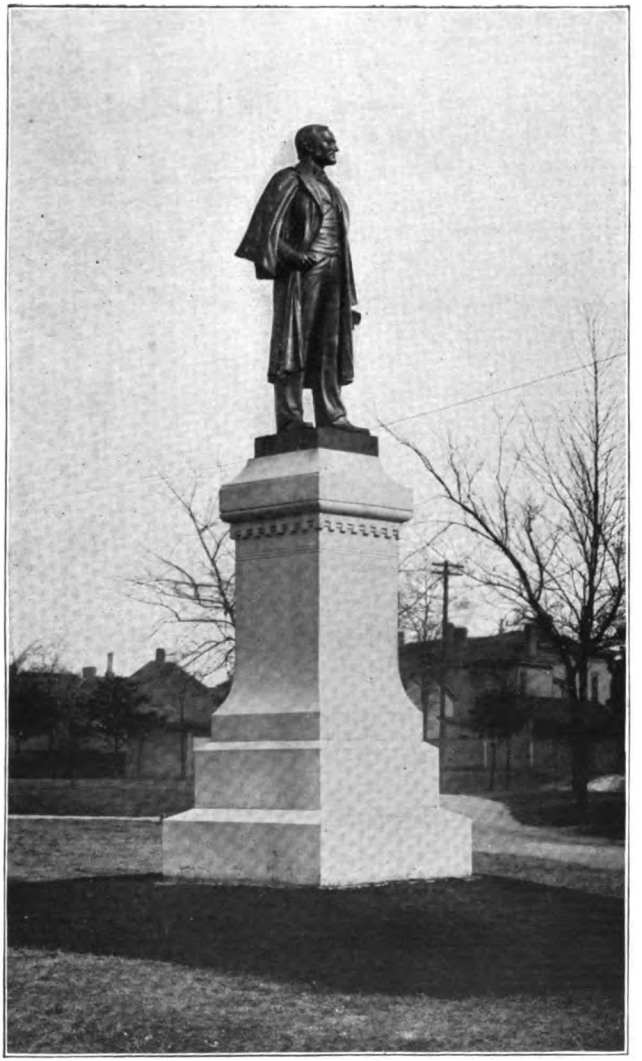

THE DAVIS MONUMENT.

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UNVEILING EXERCISES.

The monument erected by the Association to its founder, the late Dr. W. E. B. Davis, was unveiled in Capitol Park with fitting ceremonies Wednesday, December 14th, at 11 A.M. These exercises were public, and thousands of people to whom the lamented surgeon was a familiar figure in Birmingham, where he lived and died, were present on this memorable occasion.

In the procession that formed at the City Hall, immediately upon the adjournment of the morning session of the Association, the city was represented by many of its officials. The Alabama National Guard had a detachment from the Brandon Light Artillery and Troop D, Captain E. J. McCrossin commanding. The entire Cadet Corps of Howard College attended the ceremonies. Memoli's Band led the parade. Following the Alabama National Guardsmen were the members of the Association.

The monument to Dr. Davis is executed in bronze, and is of heroic size, standing nearly nine feet high.

The speakers were introduced by Dr. William D. Haggard, of Nashville.

The Rev. Dr. L. S. Handley offered prayer, after which the High School pupils sang, "Oh, How Amiable Are Thy Dwellings" (*Barnby*).

During the unveiling of the statue by Elizabeth and Margaret Davis, the little daughters of the beloved physician, Memoli's Band played "Cujus Animam" (*Rossini*), after which Dr. Charles M. Rosser, of Dallas, Texas, delivered the

ADDRESS OF PRESENTATION.

Dr. Rosser spoke as follows:

Mr. President, Ladies and Gentlemen: The Southern Surgical and Gynecological Association, in grateful acknowledgment to the beloved memory of its foremost founder and most widely distinguished Fellow, presents to the State of his nativity a statue representing Dr. William Elias B. Davis, whose tragic death, occurring by horrible accident, February 24, 1902, must ever be regarded as an unmeasured calamity to us all. It unspeakably bereaved a happy family; struck down a noble

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citizen of Birmingham, and this Commonwealth, who enjoyed in a degree second to none the admiration of his countrymen; deprived the profession he loved so well of a peerless leader, and the world of a great humanitarian.

The scientific society for which I have the honor to speak on this occasion owes its origin primarily to the creative brain of Dr. Davis. At his instance and in his office was held an organization meeting, of which the session now in progress is the seventeenth anniversary. Elected Secretary at that time, he discharged the exacting duties of this executive office with an efficiency which required of him much personal sacrifice for more than a dozen years, and not until after the Association had emerged from trial stages to its fixed place in professional esteem would he permit his selection for the Presidency, a position to which he had ever been eligible, and a consummation long the undivided will of the membership.

It is especially gratifying, in view of his untimely passing from us, that this honor was not longer deferred upon any account, for, although he had occupied positions of distinction to be attained only through merit in the most notable medical organizations in his own land and across the sea, yet he counted the Presidency of the Southern Surgical Association, from which he had lately retired, the crowning glory of them all. But how poor was our best offering, and how appropriate the sentiment inspiring this occasion! One in which, by a recognition of a brother's worthiness, we discharge an obligation of love, and an act of reciprocal affection as natural as that of parent and child.

If this day, with its proceedings, be logically followed, its lessons will be lasting and salutary. We do not engage in hero worship, nor do we disturb the vital principle of equality.

It is well that we occasionally pause in the restless rush of human activities, and in the light of camp fires recount our losses while preparing for further journey. It is to the credit of our calling, and the civilization in which it is so important a factor, that success in science and achievements in civic affairs shall be signalized as surely as attainments in the more obtrusive and glittering walks of life. The truth is, my friends, that there is urgent need in these times of commercialized consciences and of military display, that the bent of our contemplations be more often turned toward the loftier hills of faith and duty, and

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away from the more alluring scenes of conquest and carnage. There are nobler ambitions than to destroy, and never, perhaps, in the history of our race, was it more relevant to council men "lest their feet run to evil."

Supremacy should obtain only with the probity of a people, as reflected by the national character. What if Alexander the Great and Napoleon, despising humanity, however helpless, marshalled their millions to dominate the world! Each was finally manacled for a martyrdom he had himself inspired.

Anthony sought happiness in love, Brutus in glory, and Cæsar in domination. The first found disgrace, the second disgust, the last ingratitude, and all destruction. Nations that utilize power only in the exercise of barbarity, as individuals who apply wealth to sordid purposes, pass before the cycle of a Christian era, leaving only traditions that confuse and memorials that offend. There are lessons relative to men and morals that are quite as important as those of money and musketry. Physical courage and disregard of danger is least lacking in example, for beginning with Virginia and Massachusetts, history records hundreds of such heroes, the product of each succeeding generation. Our ideas are resultant from examples and environments, and these, when crystallized, control our conduct. This is true with government, as with individuals of which they are composed. Let America lead the world in letters, and excel in righteousness! These attributes, rather than uniformed physical force, will vitalize our energies at home and preserve our well-being among the nations of the earth. Learning and liberty, as comliness and character, certainly may sometimes separate, but we have not yet heard that a column is less strong because its shaft is carved, nor that the sword of Damascus was less keen because its blade was polished and its handle beset with jewels.

Great men are universally for the multitude, and whether lamented or enjoyed, an appreciation of the elementary virtues which constitute the chiefest glory of the age in which they live becomes the sublimest inspiration we may know.

Our departed brother, to whom this shaft is raised, was a many-sided exponent of the truest type of our modern civilization, a very century bloom! And without hope of adding lustre to that honor individually attained, the object of these ceremonies is rather to render more persuasive the pointings of his

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pathway, and more enduring the lessons of his life! It was not so much a characteristic of his to demonstrate special virtues, as that he practised them all with becoming modesty.

His qualities were so uniform in construction and so consistent in their adjustment that he blended the delicacy of loveliest womanhood with a stalwart sturdiness of majestic man. Nature had been lavish in his human heritage. Yet he pursued his purpose with a constancy imperative with these of whom the gods of fortune had apparently been less mindful. He was adapted to leadership because of the confidence inspired by his own convictions. This faculty enabled him to command the energies of others, without hazard of being diverted by them. While an adherent to a written code, it was never needed for his guidance. The rule of conduct which he applied to his personal and professional relations was marked by such a delicate consideration for the concern of others that he at all times exhibited that splendid ethics possible only to those of imperial brain and consecrated heart.

Generosity crowded away jealousies and made them with him impossible. Competitors of others were his compatriots, if workers in the harvest of humanity, for he recognized no rivalry in doing good.

Whether in the love-lit heights of happiness or the shades where sorrow dwell; whether swayed by success or depressed by defeat; whether wrongfully censured or applauded by men, his philosophy was too familiar with human frailties to permit vanity as an associate of pride, and his belief in the ultimate reign of right, protected from discouragement in days of doubt.

Young though he was, as the tables of time record, yet in service to his country and his kind there are few, however worn by age, the stature of whose usefulness compares with his. And yet, my friends, while we mourn the loss of what he was, our grief is infinitely increased when we consider the altitudes to which his ascending career gave promise.

Victor Hugo advises that "no man should count life either fortunate or happy until its closing hour, when calm contemplation could review its acts, adjudge it without selfishness, and the future offer no opportunity to mar the beauty and symmetry of the picturesque." Melancholy though the thought, we have the full record of the noble dead before us, and judge it as we may

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from any viewpoint, whether as husband, father, friend, physician, citizen, or man of affairs, those before whom he goes in and out no more bear me witness that no human sentiment could be a too sacred tribute to his memory, and that no words, however spoken, are worthy for his praise.

Material monuments, hewn from the granite and the marble, or those of bronze from the sculptor's hand, indicate the estimate and appreciation of merit entertained by those who rear them, and typify those memorials already builded in the minds of men. Inscriptions to the dead, however chaste the rhetoric and artful the chiselling, bear but formal meaning, unless also written upon the unerring tablets of the heart.

And now, commissioned by my colleagues, I commit this work of art, fashioned for our friend, to the good city of Birmingham, to the fair State of Alabama, and in this presence charge their chief executives who represent them here that while it is appropriately planted upon this grateful soil, its foundation stone is firmly bedded in our affections and esteem. Its custody will be your responsibility, but it will be our privilege to cherish with you the sentiments for which it stands, impressing as it ever must, upon the generations of to-day and those that are to come, the priceless value of a spotless life!

To brethren everywhere, who engage for the almost heaven-born mission of relieving pain and combating disease, I commend the open book of his life concerning creeds and conduct. Does obscurity veil, poverty oppress, and is success delayed? Find from its pages that of those who desire, the promise is to them that deserve! Emulate his habits of humility, charity and truth, his gentleness of spirit, and devotion to duty. Remember the energizing industry he employed, and that while,

> "Still achieving, still pursuing,
> He learned to labor and to wait."

We may not all mount high upon the rounds of fame, and immortelles above our tombs may wither in a day, but if we have lived in earnestness and faith toward God and man, we have not failed, and loving hands will plant for us the myrtle and the rose.

Could I address myself to the eternal interests of men, I would also urge his worthy example of substantial piety and con-

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scientious Christian character. Immortality, that supremest of all aspirations, demands the same contemplatation to-day as in the olden times when the question was asked, "If a man die, shall he live again?"

Dr. W. E. B. Davis, the pure, the true, the brave, the strong, has gone, but for him and his like

"Death is not a wall, but a door,
The beginning, not the end of day,
The spreading of pinions to soar
To a home in the great far away!
We know that lives like his are given
To bless the human race,
And lead us to the courts of heaven
To view our Father's face;
And when for us rolls back the veil,
That hides the better land,
With thrills ecstatic we shall hail
The welcome of His hand."

(Applause.)

Hon. John C. Forney, as the representative of Mayor Drennan, then accepted the statue in behalf of the city of Birmingham.

ADDRESS BY HON. JOHN C. FORNEY.

Mr. Chairman, Members of the Southern Surgical and Gynecological Association, Citizens of Birmingham: We are called here to-day to commemorate the first significant testimony which we have experienced in the young city of Birmingham to praise the splendid career of that great physician who departed from us. No man needs me to tell him of the great admiration which the city of Birmingham had for William Elias B. Davis. I have but to recall the large attendance of sympathizing friends at the funeral services upon his body, and the thousands who followed his body to its last resting place. He was a sympathetic physician and able surgeon, a man ever ready to attend the sick and to relieve suffering. I cannot say enough to add to the brilliancy of his life, to the success of his researches in the mysteries of his profession. Ladies and gentlemen, I cannot add anything. The men who have preceded me dwelt fully and ably upon his accomplishments, and all that remains for me to do as the representa-

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tive of Mayor Drennan and of the people of Birmingham is to accept this monument, dedicated to the greatest physician who lived and died in the greatest city in Alabama. (Applause.)

Dr. Haggard then introduced Dr. R. M. Cunningham, Acting Governor of the State, who accepted the statue in behalf of the State, in the following words:

ADDRESS BY DR. CUNNINGHAM.

Members of the Southern Surgical and Gynecological Association, Ladies and Gentlemen: To perpetuate in marble or bronze those who have rendered distinguished service to the State, to science or humanity is a legitimate and laudable purpose. In this particular, Alabama has been remiss. Many of her sons have distinguished themselves in war as soldiers, in peace as statesmen, and in science as scientists, yet throughout this great State there is but one statue commemorative of the valor and deeds of her sons—that of Admiral Semmes, at Mobile. Allusion is not here made to monuments erected to bodies of men, for example, the Confederate soldiers. There are many who have participated in making the history of Alabama, in its industrial development, its commercial enterprises, and in other relations of civil life, whose names should be perpetuated by statues and monuments.

The present occasion is one of rare occurrence. It is to be remarked that it is under the auspices of a scientific organization whose members consist of men who are devoting their lives to the relief of human suffering. The surgery of to-day, in its principles, is a science; in its practice, an art. A great surgeon must have the wisdom of a sage, the courage of a soldier, the judgment of a jurist, the gentleness of a woman, and the skill of an artist. To contrast surgery of to-day with that of a hundred years ago is a thorough demonstration of the great advance made in the healing art. At that time the practice of surgery was little short of assault upon the person. The strong tables of harness for confining the patient, the pulleys, levers, and other powerful mechanical instruments demonstrate its crudity. In the surgery of to-day pain has been abolished by anæsthesia, main strength by scientific manipulation, and uncleanliness by aseptic technique.

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The discovery of anæsthesia by Crawford W. Long, of Georgia, the previous invention of the ligature by Ambrose Paré, and the aseptic technique evolved from the principles of antiseptic surgery, according to Sir Joseph Lister, made the art and practice of surgery humane and safe to the patient, and requires a profound knowledge and skill upon the part of the operator. The ligature for controlling hemorrhage, the suture for coaptation, and the methods of drainage and the aseptic technique are the principal factors in the art of surgery. The knife, forceps, and needles are the principal instruments. A great display and multiplicity of surgical paraphernalia are no more evidence of the surgeon than the display of canvas, paints, and brushes is of an artist. The artist must have a thorough conception or a model for his picture. He must know what paints to select, where and in what proportion to apply them. The surgeon must have a thorough conception of the human body in its aggregate and details, each part by itself and in relation to all other parts, the purposes for which these are intended, the nature of the disease which affects them, their immediate and remote results to the part and to the body, and must have a definite ideal which he is trying to achieve, and in all of which the manipulation is one of delicacy and skill.

The present methods of surgery make it possible to explore and manipulate almost every organ and structure of the body. Great windows are cut in the skull, and the surface, base, and interior of the brain are explored. A window is cut in the chest and wounds in the heart are sutured, while the viscera of the great cavities, the chest and abdomen, are constantly brought under the surgical eye. In some cases surgery saves life by the sacrifice of a part; in others it restores the health by the removal of useless and painful structures; in some it restores deformed and diseased parts to their normal relation and function.

Any man who understands the principles of surgery and who has the skill and dexterity to practise the art is a great man. He not only has the lives of others in his own hands, but he often places his own life in danger. He is, therefore, a hero.

Gentlemen of the Southern Surgical and Gynecolgical Association, you have met here to-day, as a body, to witness the unveiling of a statue of such a man—Dr. W. E. B. Davis. You were his co-workers, brethren, and peers. By virtue of your own

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knowledge and experience, you are better qualified to judge of his merits as a surgeon than anyone else. In recognition of these merits and as an expression of your gratitude to him as the founder of your organization, you have contributed this splendid statue. Coming, as it does, from those who are best qualified to judge of him as a surgeon, from those with whom he has been so often associated in the discussion of surgical problems and practice, it is a special work of honor and distinction.

Had it been contributed by his family and friends, it would be one of love and affection; by the general public, one of esteem and respect, but from you it is from all these, with the addition of a profound appreciation and admiration of his great ability. In doing this, gentlemen, you have honored yourselves. You have shown to the world that the doctor is capable of appreciating and expressing that appreciation of his brother doctor and competitor. It is a recognition of your obligation to Dr. Davis, who saw the possibilities of the great success that you to-day enjoy. You look upon this statue to-day with loving eyes and feeling hearts; it recalls to your mind a courteous, affable, polite, dignified gentleman, that you knew in your social relations; it recalls to your mind the profound scientist who discussed in your hearing the great principles of modern surgery. You see in it an image of the considerate but strong debater, a man who knew his ground and vigorously maintained it. You see the image of one who was not only an innovator in establishing modern surgery in the community in which he lived, but a pioneer in investigation and discovery. Altogether you recall the enthusiasm, ambition, energy, and activity of Dr. Davis. Rising from poverty and obscurity, he made a name in the world which is most known among his co-workers. His life-work was success, not the least of which is this splendid association of great and distinguished surgeons.

Aside from my friendship and admiration for Dr. Davis, aside from the fact that I am a Fellow of this Association, and, therefore, one who appreciates your great work and your motive in erecting this statue, I come here to-day as the present Executive of Alabama, in consideration of the science of surgery and the obligation that humanity is under to the surgical profession, and in further consideration of the character as a man and surgeon of Dr. Davis, to receive, upon the part of the State, this

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splendid statue, which will here stand as a memorial of his greatness as a surgeon, of his character as a man, and of your appreciation, as a body of scientific workers, and as an inspiration to the young men of the State who aspire to nobility of character and greatness in achievement. (Applause.)

The exercises were concluded with songs by the High School pupils, after which the assemblage was dismissed with a benediction by the Rev. Dr. Hale, of the Southwestern University, Jackson, Tennessee.

Afternoon Session.—The Association reassembled at 2 P.M., and was called to order by the Second Vice-President.

15. "The Management of Acute General Peritonitis," by Dr. J. Garland Sherrill, of Louisville, Kentucky.

Discussed by Drs. Earnest, Carr, McGuire, Murphy, Finney, Mayo, Richardson, Brown, Haggard, Bonifield, and the discussion closed by the author of the paper.

16. "Some Further Advances in Renal Surgery," by Dr. John B. Murphy, of Chicago, Illinois.

Discussed by Drs. Mayo, Bovée, Rogers, and Young.

17. "(*a*) Vesical Diverticula; Report of Four Cases Requiring Operation. (*b*) The Ultimate Results Obtained by Conservative Perineal Prostatectomy in Seventy-five Cases," by Dr. Hugh H. Young, of Baltimore, Maryland.

Discussed by Drs. Murphy, Gaston, Caldwell, Mayo, and, in closing, by the author of the paper.

18. "When Shall we Resect in Tuberculous Disease of the Joints," by Dr. C. E. Caldwell, of Cincinnati, Ohio.

Discussed by Drs. Martin, Milliken, and, in closing, by the essayist.

19. "Obliteration of the Stomach by Caustic," by Dr. Samuel J. Mixter, of Boston, Massachusetts.

Discussed by Drs. Richardson, Finney, and Oliver.

On motion, the Association adjourned until Thursday, at 9 A.M.

THIRD DAY.—*Thursday, December* 15, 1904.

Morning Session.—The Association met at 9 A.M., with the Second Vice-President in the Chair.

20. "Two Cases of Tumor of the Pancreas," by Dr. J. A. Goggans, of Alexander City, Alabama.

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Discussed by Drs. Coley, Sherrill, Roberts, and, in closing, by the essayist.

21. "Vaginal Cæsarean Section, with Report of a Case," by Dr. C. Jeff. Miller, of New Orleans, Louisiana.

Discussed by Drs, Martin, Stone, Johnson, Goggans, Long, Hall, and the discussion closed by Dr. Miller.

22. "Dermoid Fistulæ of the Sacrococcygeal Region," by Dr. Lewis C. Bosher, of Richmond, Virginia.

Discussed by Drs. Martin, Long, Milliken, Roberts, and Murfree.

23. "Hæmatoma of the Ovary," by Dr. Magnus A. Tate, of Cincinnati, Ohio.

This paper was discussed by Drs. Boldt, Byford, Hall, Bonifield, Dudley, Goggins, and Chambers.

24. "The Surgical Treatment of Tuberculous Peritonitis, with Report of Cases," by Dr. J. E. Stokes, of Salisbury, North Carolina.

Discussed by Drs. Byford and Mayo.

Dr. Bosher, Chairman of the Auditing Committee, reported that the Committee had examined the accounts of the Secretary and Treasurer, and had found them correct.

On motion of Dr. Boldt, the report was accepted.

The Secretary read the report of the Council, as follows:

REPORT OF THE EXECUTIVE COUNCIL.

BIRMINGHAM, ALABAMA, December 14, 1904.

The Council begs leave to submit the following report of recommendations:

1. That the next meeting be held in Louisville, Kentucky, December 11, 12, 13, 1905, and that Dr. W. O. Roberts be chosen as Chairman of the Committee of Arrangements.

2. That the following-named gentlemen are eligible and are nominated for Fellowship:

Dr. J. M. T. Finney, Baltimore, Maryland.
Dr. Robert Carothers, Cincinnati, Ohio.
Dr. John F. Moran, Washington, D. C.
Dr. John M. Ochsner, New Orleans, Louisiana.
Dr. James M. Batchelor, New Orleans, Lousisana.
Dr. James E. Stokes, Salisbury, North Carolina.

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Dr. P. F. Chambers, New York City.
Dr. Daniel F. Craig, Boston, Massachusetts.
Dr. T. P. Whaley, Charleston, South Carolina.
Dr. Frank A. Lupton, Birmingham, Alabama.
Dr. James M. Mason, Birmingham, Alabama.
Dr. J. N. W. Peters, Birmingham, Alabama.

3. That the following Fellows are nominated for the officers for 1904–05: President, Dr. Lewis C. Bosher, Richmond, Virginia; First Vice-President, Dr. John D. S. Davis, Birmingham, Alabama; Second Vice-President, Dr. I. S. Stone, Washington, D. C.; for Secretary and Treasurer, the present incumbents, whose terms have not expired. For member of the Council, to fill the vacancy occasioned by the expiration of service of Dr. L. McLane Tiffany, Dr. F. W. Parham, New Orleans, Louisiana.

There has come to the knowledge of the Council the following deaths: Dr. J. A. Dibrell, of Little Rock; Dr. B. E. Hadra, of Dallas; Dr. V. O. Hardon, of Atlanta; Dr. Ferdinand Herff, of San Antonio, and Dr. William R. Pryor, of New York.

Two vacancies have occurred by the resignations of Dr. R. R. Kime, of Atlanta, and Dr. F. A. La Rue, of New Orleans.

Dr. Haggard made a verbal report for the Council to the effect that the Council had accepted as a donation to the Davis Monument Fund $1500 from Dr. John D. S. Davis, for the completion of the monument, and hoped that the Association would approve this.

All of which was respectfully submitted.

On motion of Dr. Sherrill, the report of the Council was adopted in its entirety.

The Second Vice-President appointed as a committee to escort the newly elected President to the Chair, Drs. Roberts, Martin, and Long.

In introducing Dr. Bosher, Dr. Horsley said: Your newly elcted President, Dr. Bosher, hardly needs an introduction to you, as he is well-known to the Society. The Association will find that its choice has been a wise one.

Dr. Bosher, in taking the Chair, said: I shall not attempt to make a speech, but simply wish to express my gratitude and appreciation for the honor that has been conferred upon me. I shall aim to discharge faithfully all of my duties in behalf of the

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Association, to show you that I am not unmindful of the trust that has been confided in me. This Association has been fortunate in having as presiding officers some of the most distinguished men in the medical profession, and I trust I may successfully follow the good example that has been set by them. My chief aim shall be to serve this Society to the best of my ability, and if any error is committed, I ask you to charge it to the head and not to the heart. (Applause.)

The Secretary read letters and telegrams of regret from the following members, who were unable to attend the meeting: Dr. F. E. Baldridge, Dr. J. M. Baldy, Dr. William B. Coley, Dr. A. H. Ferguson, Dr. Floyd W. McRae, Dr. W. P. Manton, Dr. Lane Mullally, Dr. Hugh T. Nelson, Dr. Charles P. Noble, Dr. Roswell Park, Dr. William Warren Potter, Dr. Charles A. L. Reed, Dr. H. A. Royster, Dr. H. Tuholske.

Dr. Herman J. Boldt, of New York, demonstrated tables and instruments.

25. "Tracheotomy for Gunshot Wounds of the Trachea," by Dr. J. McFadden Gaston, of Atlanta, Georgia.

Discussed by Drs. Goggins, and, in closing, by Dr. Gaston.

On motion, the Association adjourned until 2.30 P.M.

Afternoon Session.—The Association reassembled at 2.30 P.M., with President Bosher in the Chair.

26. (*a*) "Report of a Case of Suprapubic Cystotomy; (*b*) Intraperitoneal Hydatids," by Dr. William J. Doughty, of Augusta, Georgia.

27. "Stypticin," by Dr. Herman J. Boldt, of New York City.

Discussed by Drs. Johnson, Craig, Horsley, Dudley, Brown, and the discussion closed by the essayist.

28. "Observations upon the Aseptic Technique of Abdominal and Pelvic Surgery," by Dr. Henry T. Byford, of Chicago, Illinois.

Discussed by Drs. Bovée, Bonifield, Stone, Mayo, Martin, Williams, McMurtry, Sherrill, Long, Carr, and the discussion closed by the essayist.

29. "Strangulated Hernia," by Dr. J. B. Murfree, of Murfreesboro, Tennessee.

Discussed by Drs. Haggard, Gaston, Sherrill, Milliken, Doughty, and Bonifield.

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30. "Two Cases of Cancer of the Appendix," by Dr. E. Denegre Martin, of New Orleans, Louisiana.

Discussed by Dr. Sherrill.

31. "(*a*) Encephalomeningocele; (*b*) An Easy Method of Introducing Peritoneal Gauze Drainage through the Cul-de-Sac," by Dr. W. D. Haggard, of Nashville, Tennessee.

32. "Report of a Case of Rupture of the Diaphragm," by Dr. George S. Brown, of Birmingham, Alabama.

Discussed by Dr. Martin, and, in closing, by the essayist.

Dr. Charles M. Rosser, of Dallas, Texas, offered the following resolutions of thanks:

1. *Resolved*, That the thanks of the Association be tendered the Committee of Arrangements and profession of Birmingham for the uniform courtesies and splendid entertainments provided during our session, which we believe to be one of the most successful in the history of the Society.

2. *Resolved*, That our appreciation be known to the several papers of the city for their services in reporting our proceedings, and the citizens generally for the hospitality manifested in many ways.

On motion, the resolutions were unanimously adopted, after which the Association adjourned, to meet in Louisville, Kentucky, December 11, 12, 13, 1905.

W. D. HAGGARD, M.D.,
Secretary.

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BOSTON MEDICAL
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A METHOD OF UNITING INTESTINES OF VERY SMALL OR OF UNEQUAL CALIBRE.

By J. Shelton Horsley, M.D.,
Richmond, Va.

No operation on the intestines depending wholly, or in large part, upon suturing for approximation can be satisfactorily established without going somewhat into the relative merits of the various methods of suturing in general use. The continuous and the interrupted sutures may be termed the two generic divisions, subdivisions and modifications of these being numerous. The advantages of the continuous suture penetrating all the intestinal coats over the interrupted suture, such as uniform pressure, rapidity of application, and splint-like action, have been described in a previous paper in the *Annals of Surgery*, November, 1903; but in the study of these two methods there is one feature so frequently overlooked that I hope I may be pardoned for emphasizing it—the phenomena of the process of repair in intestinal union. When two serous surfaces adhere there is always a reason for it. Adhesions of the pleura indicate a previous lesion; adhesions of the pia mater are proof of a former inflammation; and it is common knowledge that peritoneal adhesions exist because of pre-existing damage to this serous membrane. There must be something besides mere approximation necessary to cause serous surfaces to adhere, else immobilized joints would be rendered functionless and a strapped chest would cause obliteration of the pleural cavity. No one would think of doing a perineorrhaphy by merely putting in sutures without denuding

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the surfaces to be approximated. Except for the fact that the peritoneum is a much more delicate structure and consequently more easily injured than a mucous membrane, there is no difference in principle between a perineorrhaphy thus performed and an intestinal union done with interrupted sutures.

These conclusions were derived mainly from the following experiments: Two coils of intestine were laid side by side and united by a row of continuous stitches about 4 cm. long. At a distance of about 1 cm. a second row of sutures of the same length as the first and parallel to it was placed. The area of the peritoneum included between these two rows of sutures was in accurate apposition, but without pressure except near the region of the sutures. The dogs were killed on one, two, three, four, six, and eight days after the experiment, and the specimens removed and sent to Dr. J. S. Davis, Professor of Pathology in the University of Virginia, whose report is appended to each experiment. In the first six No. 1 twisted black silk was used, and in the last three No. 2 white braided silk.

Experiment 1. Large, black, short-haired, mongrel, male dog, medium weight. Two coils of intestine sutured together with fine black silk, the rows of sutures running parallel and in the long axis of the gut; specimens removed after one day (twenty-four hours).

Pathologist's Report. About three-quarters of approximated surfaces between the rows of sutures adherent; average distance of rows from each other, 9.3 mm.

Experiment 2. Heavy-set, black, male shepherd dog, medium weight. Same procedure as in preceding experiment; specimen removed after two days (forty-eight hours).

Pathologist's Report. Nearly all the area between the rows of sutures adherent; average distance of rows of sutures from each other, 13.3 mm.

Experiment 3. Rather small, liver and white spotted, male setter dog. Same procedure as in preceding experiments; specimen removed after three days.

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FIG. 1

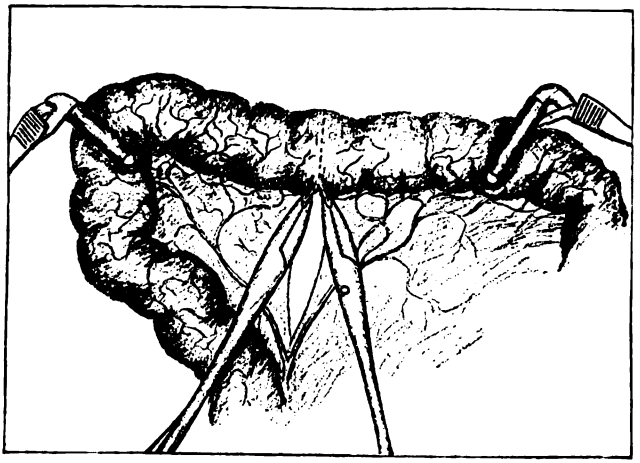

FIG. 2

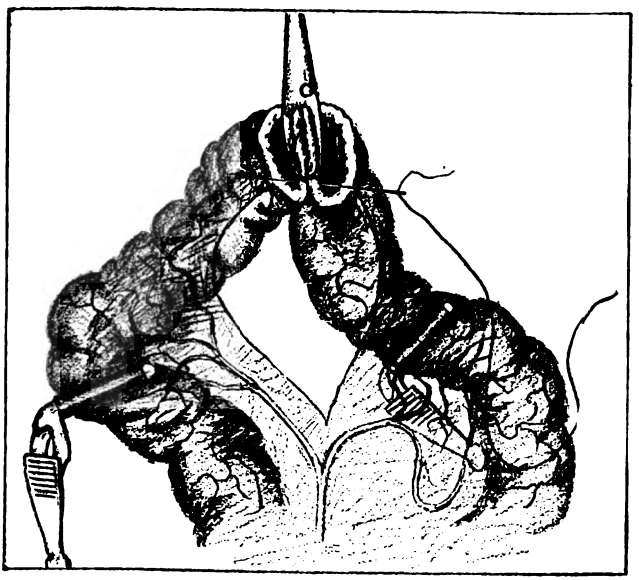

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FIG. 3

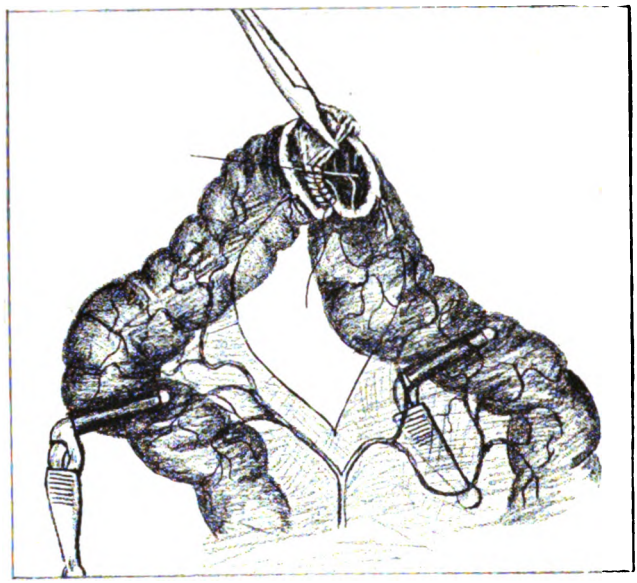

FIG. 4

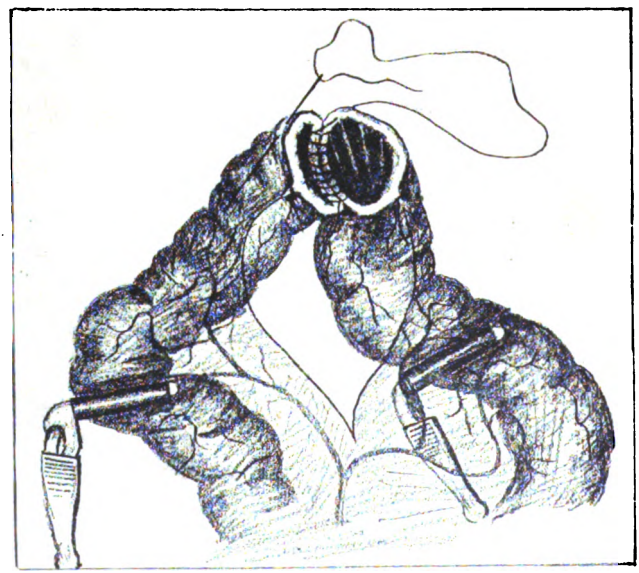

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FIG. 5

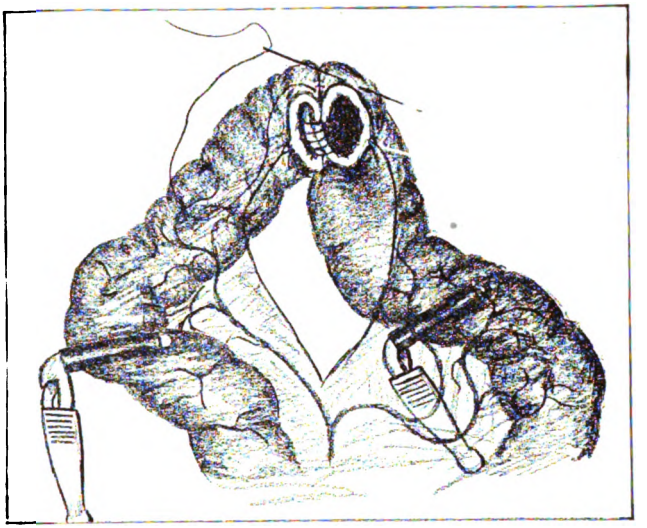

FIG. 6

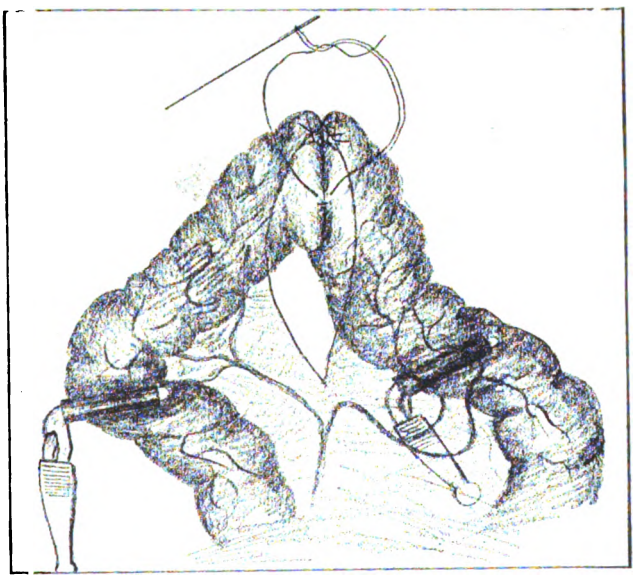

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Fig. 7

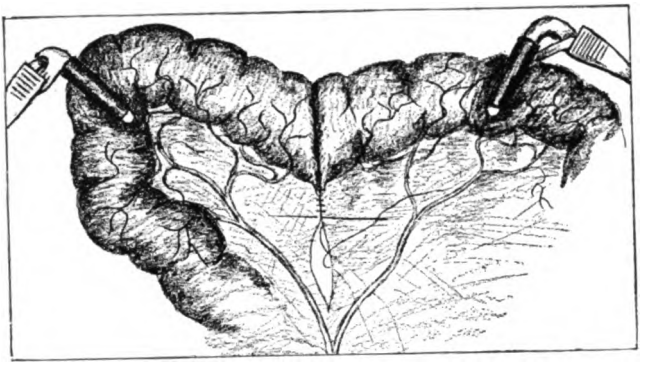
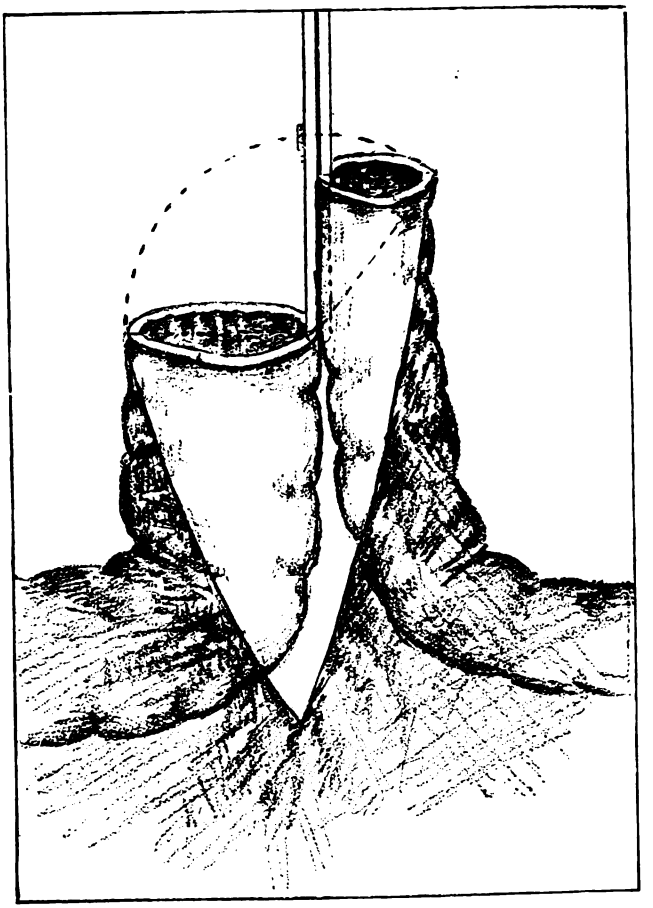


Fig. 8



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Pathologist's Report. Nearly all adherent; average distance of rows of sutures from each other, 11 mm.

Experiment 4. Rather small, male shepherd dog. Same procedure as in preceding experiments; specimen removed after four days.

Pathologist's Report. Not more than three-quarters of area between rows of sutures adherent; average distance of rows of sutures from each other, 11 mm.

Experiment 5. Long-bodied, long-haired, black male dog, medium weight. Same procedure as in preceding experiments; specimen removed after six days.

Pathologist's Report. All adherent; average distance of rows of sutures from each other, 9.3 mm.

Experiment 6. Small, heavy-set, yellow, male cur dog. Same procedure as in preceding experiments; specimen removed after eight days.

Pathologist's Report. All adherent; average distance of rows of sutures from each other, 12.5 mm.

Experiment 7. Small, brown, spaniel bitch. Experiment similar to the preceding ones, except that No. 2 white braided silk was used instead of fine black twisted silk; specimen removed after four days.

Pathologist's Report. Nearly all adherent; distance between rows of sutures, 9.4 mm.

Experiment 8. Young black and tan, mongrel male dog, medium weight. Procedure same as in Experiment 7, using white braided silk; specimen removed after six days.

Pathologist's Report. All adherent; distance between rows, 10.9 mm.

Experiment 9. White and black spotted, setter bitch, medium weight. Same procedure as in Experiments 7 and 8, using white braided silk; specimen removed after eight days.

Pathologist's Report. All adherent; distance between rows, 10.9 mm.

Thus it will be seen that in these nine experiments the whole area included between the rows of sutures united only

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four times and in two instances the large coarse silk was used, which excited more hyperæmia of repair than the small black silk which was employed in six of the experiments. These results indicate clearly that approximation alone is not sufficient to secure union of peritoneal surfaces.

Intestinal union by interrupted sutures is obtained *within the bite of the suture* by hyperæmia excited by pressure of the suture, by the trauma of the needle, and by the presence of the thread. *Between the sutures*, as pressure from the thin intestinal tissues is practically *nil*, union depends solely upon the extension of this hyperæmia, and if this process does not extend from one stitch to another leakage will surely occur.

If continuous and moderate pressure is made on two approximated serous surfaces, sufficient injury will be done those surfaces to cause adhesions. In the case of the interrupted suture this condition obtains only within the bite of the stitch, but when the continuous suture, penetrating all coats, is employed, there is continuous pressure at every point of the sutured wound. As a matter of fact, many surgeons who use the interrupted suture employ that form which most nearly approximates the continuous. The mattress-stitch and the purse-string suture produce pressure upon a much larger area of the peritoneum than the Lembert, and are, therefore, superior to it. But only the continuous suture fulfils the ideal condition of uniform pressure along the entire margin of the intestinal wound.

When intestinal ends are of moderate and equal diameter there is, under ordinary conditions, no better method of uniting them than by the continuous, penetrating, right-angled suture. It is where the segments are unusually small or unequal in size that the method about to be described seems particularly applicable. Not only is this latter condition found when ileum is to be joined to colon, but after chronic obstruction the proximal segment is always larger than the distal. In intestines, both of unequal and very small diameters, stricture is liable to occur after union by most methods now in vogue, and avoiding this undesirable

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FIG. 9

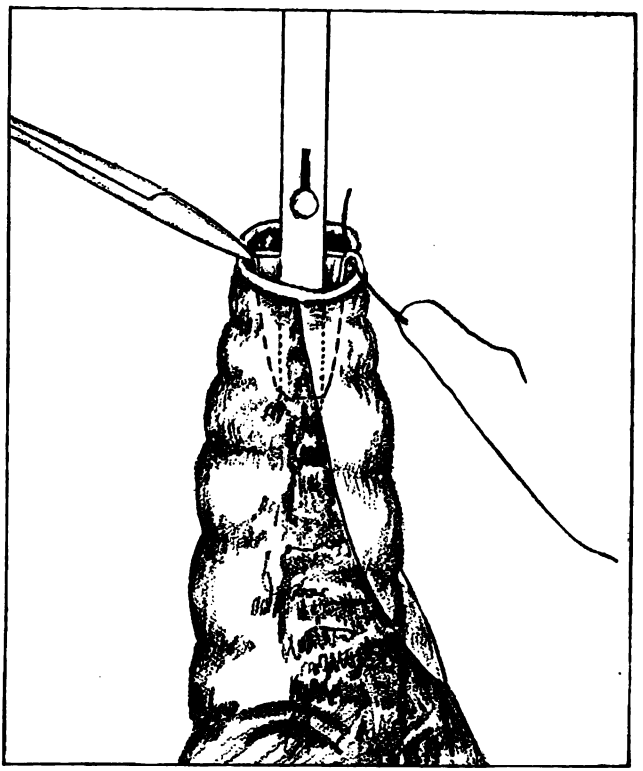

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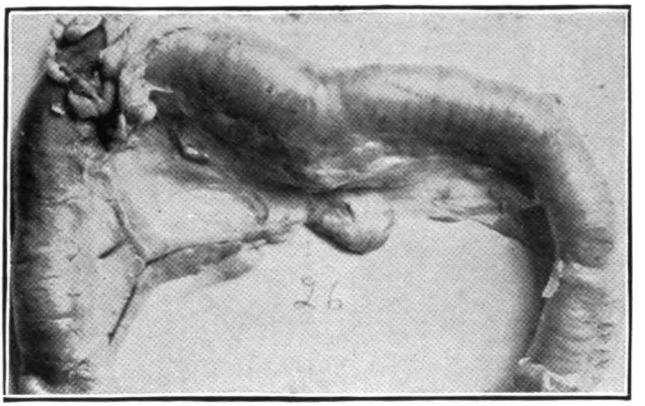
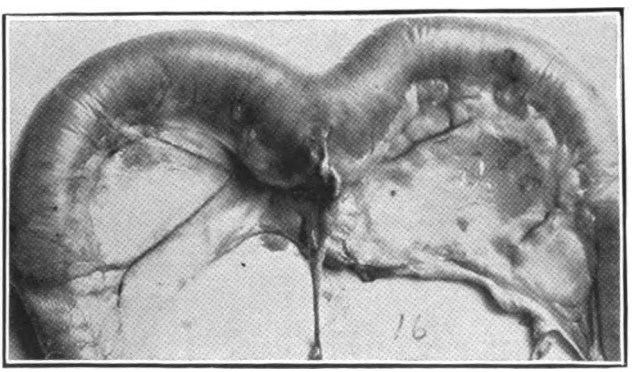
FIG. 10



Photograph of intestine from Experiment 26. The wax cast was broken while being taken from the intestine; so it could not be photographed. Note the adhesions of the omentum to the portion of the intestine compressed by Murphy clamp to coprostasis.

FIG. 11



Photograph of intestine from Experiment 16. Slight omental adhesions; eighty-two days after operation

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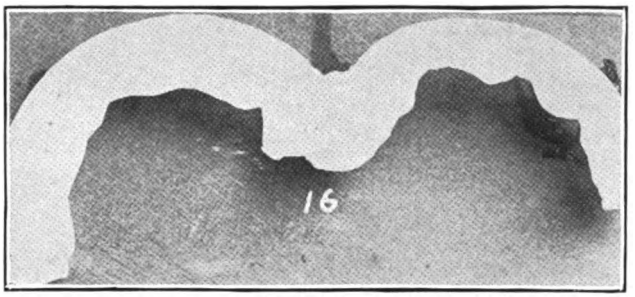
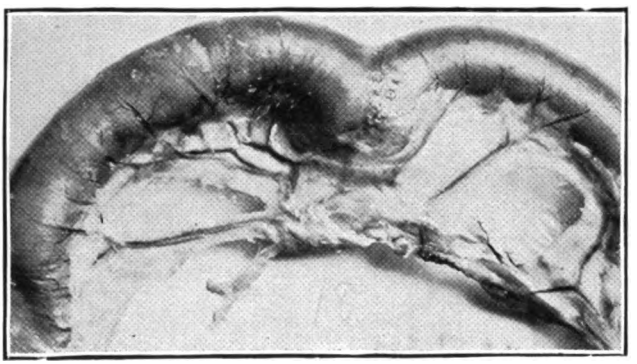
FIG. 12



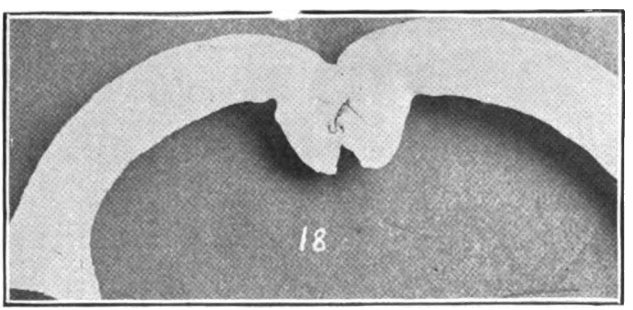
Wax cast of intestine from Experiment 16.

FIG. 13



Photograph of intestine from Experiment 18; eighty-two days after operation.

FIG. 14



Wax cast of intestine from Experiment 18; the stitches which had not entirely loosened from the intestine are seen embedded in the cast.

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complication is one of the advantages of the new operation.

After experiments in other directions, this operation has proved satisfactory in every instance. Of nineteen dogs operated upon by this method, none died.

Operation. A single knot of a soft-rubber tube is used, as recommended by Ballance and Edmunds, to obtain coprostasis. The mesentery is incised; in resection, a triangular portion may be removed. The vessels at the mesenteric border of the intestine are clamped before being cut. The forceps that clamp the vessels are also made to include both layers of peritoneum as they separate from the mesentery to encircle the bowel. The tissue within the bite of the forceps is ligated with fine silk, so drawing the peritoneum over the area of bowel usually devoid of a serous coat, and at the same time closing the vessels. This stage is shown in Fig. 1.

Next, the bowel is divided or resected, as the case may be, and the convex borders placed in contact and held in this position with hæmostatic forceps. An ordinary No. 8 sewing needle, threaded with braided silk, transfixes both walls of the intestinal ends about half-way between the mesenteric insertion and the forceps (Fig. 2). The suture is drawn through and tied. A portion of the intestinal walls forming a crescentic area, the centre of which is grasped by the hæmostatic forceps, is now cut out with scissors by cutting about one-third of an inch at a time and suturing the cut edges together with a continuous circular (overhand) stitch, penetrating all coats, and then cutting another one-third inch and suturing, and so on until the crescenting area is excised (Fig. 3); or the continuous Connell suture may be used, suturing first for a few stitches and then cutting. The needle is inserted about six times to the inch, and moderately firm tension is constantly kept on the thread with the left hand. When this crescentic area has been removed, and the margins from which it was cut have been sutured in the manner described, the needle is thrust directly through

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the intestinal wall just to the right of its last puncture and emerges from the serosa. The character of the stitch is now changed to a Cushing right-angled continuous suture, penetrating all coats, which readily inverts the remaining margins of the wound (Fig. 4). The stitch is continued (Fig. 5) with moderately firm traction on the thread. When the first knot is reached it is invaginated, and the suture continued by two more insertions of the needle. With these last two insertions of the needle as secure a hold as possible is obtained without penetrating to the mucosa. The very last insertion is in the reverse direction of the other insertions, so that when the knot is tied it is partly buried (Fig. 6). If desired, it may be completely buried by a single mattress stitch, though I have never thought this necessary. After this suturing is completed but little of the thread can be seen. The bowel is then turned to its natural position, and with another needle, similarly threaded, the mesentery is sewed up with a continuous stitch (Fig. 7). The needle is inserted in the mesentery at its junction with the bowel, and the first knot when tied acts as a mesenteric stitch. It is placed close to the bowel, though no attempt is made to include any portion of the intestinal wall in its grasp, as in the Mitchell-Heamner or Halsted mesenteric stitch.

When bowel of unequal calibre is to be united, the two segments are clamped by taking a deeper bite on the small bowel than on the large, so, when the mesenteric borders of both segments are lifted up, these borders will be on the same level (Fig. 8). One corner is caught with a hæmostat and the suturing is begun at the other corner (Fig. 9). All of the crescentic area is cut from the small gut except at the points where the hæmostats are applied, as here both bowels are clamped. Otherwise the operation is finished as above described.

In order to test the calibre of intestines that had been subjected to this operation, the specimen, including the site of operation, immediately after removal was filled with melted paraffin and photographed. The intestine was then

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removed and the paraffin model photographed. Some of these pictures are herewith submitted and show one of the advantages contended for; that is, the large diameter of the intestine at the point of union, a diameter which may be extended much more if deemed necessary. Attention is also called to the fact that there are very few adhesions to the site of the union. Halsted lays great stress upon the absence of adhesions following an intestinal union, and claims that no intestinal operation is satisfactory in which numerous adhesions result.

DISCUSSION.

Dr. W. P. Carr, of Washington, D. C.—I have listened with a great deal of pleasure to Dr. Horsley's paper, as it is both interesting and instructive. I think we have learned much in regard to abdominal surgery from such experiments as have been mentioned and operations upon the lower animals, and while there is a difference in the size and thickness of the walls of the intestine in dogs and in man, still that makes no difference in the result as regards adhesions, as the essayist has pointed out. I think the point brought out, that the adhesion is firmer from the continuous suture than from the interrupted suture, is an important one, and the method he has devised for suturing intestines of different sizes seems to me to leave almost nothing to be desired. We all experience difficulty at times in preventing eversion of the edges of the bowel; there is a slipping of one coat of the bowel over another, and sometimes there is quite a wide separation of the mucous coat from the peritoneal coat, but by clamping as he does he prevents that entirely, and by cutting a little at a time and suturing we obviate the slipping of the coat of the bowel in that way.

The question of holding the bowel with a clamp, a rubber ligature, a tape, or something of that sort, to prevent the escape of inestinal contents during operation, is the only part of intestinal suture that is not as perfect as it might be. There is more or less danger of injuring the bowel by any sort of clamp or ligature which is put around it tight enough to prevent the intestinal contents from escaping. I think it is well to hold the bowel with the fingers of the assistant when possible; it facilitates the operation very much to take the bowel in a long clamp, not far from the point where it is going to be sutured, thus preventing the slipping or sliding of the coats over each other. However, if the gut be clamped, as Dr. Horsley has recommended, in the centre, and

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that may be done whether we are going to unite bowel of different calibre or of the same calibre, it is an advantage to have union with an angle rather than a straight cross-cut of the bowel. By clamping in that way, and cutting a small piece at a time, slipping can be prevented, and under such circumstances in many cases the bowel can be held by the fingers of an assistant instead of using any form of clamp or ligature around it.

Dr. Herman J. Boldt, of New York City.—I do not know that I can add anything of interest to what has already been said with regard to the subject under discussion. It seems to me, however, that intestinal surgery is a field which at times presents various aspects, and that general consideration has been so well presented by the reader of the paper and by the subsequent speaker that in my opinion there is nothing to be added. Inasmuch as the President asked me to discuss this subject, before taking my seat I wish to say that personally I prefer suturing to the use of buttons or mechanical devices for the purpose of anastomosis.

Dr. J. M. T. Finney, of Baltimore, was asked to discuss the paper. He said: I am not a member of the Association, but I appreciate the compliment of being asked to say a word.

There is nothing I can add, I fear, to what has been said, but I can relate my own personal views and observations in this matter. In my experience I have found that there are certain technical difficulties in the way of end-to-end suture that are very hard to overcome. For instance, at the mesenteric border it is difficult to obtain satisfactory union; there is so much likelihood that a leak will occur there that it has been my practice for the last two years to use almost exclusively lateral anastomosis, after closing both ends. It seems to me that this method gives more satisfactory union and does away largely with the serious aspect of this operation. Dr. Horsley's method strikes me as being a satisfactory one for end-to-end anastomosis. Did I understand him to say that he uses the continuous suture all the way round?

Dr. Horsley.—Yes, sir.

Dr. Finney.—There is one objection to that, in that there is danger always (or the temptation to it, at any rate) of pulling the suture a little too tight. In order to get good apposition there is danger of constriction. With one continuous suture going entirely around the circumference of the bowel, dilatation of the bowel is prevented, and in case of gaseous distention the circulation of the bowel at this point is jeopardized.

With regard to anastomosing large and small calibred bowel, I would like to ask Dr. Horsley if he has noticed at any time a tendency to the formation of an angle or kink at the point of union? It seems to me that there would be some likelihood of producing a kink, and I ask for information.

Dr. Horsley.—Yes.

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DR. FINNEY (resuming).—I am an advocate of the interrupted suture. It seems to me that the mattress suture, as suggested by Halsted, alternating with the Lembert, gives more satisfactory results than the continuous suture. I have tried them both clinically and experimentally, and still adhere to the interrupted suture. It takes a few moments longer to use it, but there is no danger of constricting the lumen of the gut. You can always bring your apposition just where you want it with the interrupted suture, whereas you are so apt with the continuous suture to go too close to the cut edge on one side, and to have eversion on the other. From my own experience, I should say that while the continuous suture is quicker and may have certain advantages, still the interrupted suture is not to be entirely discarded. Personally, except in special cases, I prefer it. Suturing, except where great speed is required, has distinct advantages over any mechanical appliance, as, for instance, the Murphy button, or any other mechanical device.

I was very much interested in the paper, as it opened up some interesting points.

DR. E. DENEGRE MARTIN, of New Orleans,—Did I understand you to say, Dr. Horsley, that in repairing the large intestine you cut vertically across it, and that the oblique cut is on the small intestine?

DR. HORSLEY.—Yes.

DR. A. PALMER DUDLEY, of New York City.—I am very sorry that I could not get here in time to hear this paper, but still from the drawings I caught the drift of it.

One of the speakers brought up the question of the continuous suture versus the interrupted. From my own experience, the use of the continuous suture has been fairly good in intestinal work. I remember one operation in particular that I did, in which I resected five inches of the descending colon, using fine silk as a continuous suture around and around the gut from the mesentery back to the mesentery, taking first the mucous membrane, but not allowing the suture to go through it so as to touch the inner surface of the gut; then attention was directed to the muscular coat, the peritoneal coat, and finally a Lembert suture inserted outside of all. The physician in charge of the case, in his eagerness, tried to move the bowels. He gave a large dose of physic (croton oil), and two hours after the intestine was dropped back he had several movements by the normal channel. She recovered from this operation; three months later she died from carcinoma of the liver. I had the opportunity of making a post-mortem examination, and found the gut perfectly united. There was no stricture whatever.

I still believe that the continuous suture, if properly adjusted, is safer than the interrupted. I could cite many cases, if time permitted, in which I have resected intestine, and have obtained good

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union. I have never used the interrupted suture; therefore, it would not be fair for me to take this stand without some little explanation as against the men on the opposite side.

Dr. Martin.—In regard to the use of the continuous suture, I have as a rule run it half-way around; I consider that this saves time and guards against stricture of the bowel, which might occur if the suture were continuous. But it struck me that in making the anastomosis described by the essayist, of the large with the small intestine, the larger the intestine the more acute the angle would be, because the small intestine is cut more obliquely, and this can be avoided. By cutting the calibre of the large intestine obliquely, and then cutting the calibre of the small intestine still more so, we can work out the acute angle to a great extent. It will make a funnel-shaped anastomosis and thus overcome the danger of an acute angle.

Dr. Carr.—Since the question of obstruction by angles has been raised, I will say that an angle in the bowel unless it is an acute angle does not make a particle of difference. We have angles naturally in every part of the bowel. An angle formed in this way would never be more acute than a right angle, never more than an angle of 100 degrees, and could do no harm.

As to the continuous suture, I think it is very much to be preferred in every way to the interrupted suture, and all the objections that have been raised against it can be overcome by exercising a little care. In the first place, I do not think that there is any more danger of making one side too loose and the other too full with the continuous than with the interrupted suture. We are likely to do it with either, if we are not careful. The continuous suture may be fastened every eight or ten stitches, if desired, by simply taking a stitch through the loop and drawing it tight. And it has occurred to me that perhaps the trouble Dr. Finney has mentioned, of getting good union at the mesenteric junction, is much less with the continuous than with the interrupted suture. I think possibly the reason Dr. Finney has had trouble there is because of the use of the interrupted suture. Personally, I have never seen any trouble from lack of union at the mesenteric junction.

At the last meeting of this Association I presented some metal clamps I had been using for intestinal work. I have used them once or twice since then, with good results; but the method of suturing has been so much simplified within the past year that I now find very little use for those clamps. It is only when the bowel cannot be easily reached that I shall use clamps of that kind again.

Dr. W. S. Goldsmith, of Atlanta, Georgia.—It has occurred to me that in this discussion we have overlooked a principle which I think Dr. Finney had in mind, and that is, in placing a continuous suture around the bowel, where there is very likely

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to be distention, is it not very probable that some leakage is apt to result, or a fistula may be produced by some tissue necrosis incident to the distention of the bowel on account of the application of this ligature? It is a ligature in effect around the bowel; we have distention of the gut, and this ligature does not expand; there is no elasticity about it, and at that particular point the constriction is about the same as it was when the suture was inserted. Therefore, the interrupted suture, it appears to me, would be preferable, although perhaps not so rapid, and the pressure would be minimized, owing to the distention or dilation of the gut.

Dr. Samuel J. Mixter, of Boston, Mass.—This subject has been so well covered that there remains little to say. I suppose there will be a difference of opinion on the part of those who prefer the interrupted suture and those who prefer the continuous suture. But it seems to me, when one is in a hurry, the continuous suture is quicker. As far as breaking the continuous suture, at times in the circuit of the bowel is concerned, I cannot see that this would make the slighest difference, because if you break it enough to allow any expansion at that point, you will get a leak. Therefore, you have either got to use the continuous or interrupted suture.

There is one point which I think should be mentioned, which was not referred to, if I remember rightly, and that is the absolute necessity of everybody practising on the lower animals before he begins this work on patients. This is a point that is not sufficiently recognized and emphasized. Even good surgeons, when they try a new method, are apt to take it up by reading about it and do it wrong. Therefore, every new method should be tried on some of the lower animals.

The question of clamp or no clamp is interesting, and I think that, so far as my experience goes, very little clamping is necessary even if there is some leakage. I do not consider that there is any great danger of septic peritonitis following, because the peritoneum stands a great deal of soiling without much damage; it can be washed off and produce no ill effect. That is true of operations on the stomach.

The question of the continuous as against the interrupted suture causing constriction at the point of suture is interesting, but I am very sure that if too much of the intestine is not rolled in so as to form a diaphragm, there is very little danger of constriction by the use of the continuous suture. You always have, if you know how to do it, plenty of room for the passage of gas or feces. There is no reason why in the use of the continuous suture there should be occlusion of the bowel, unless the mass you turn in acts as a diaphragm or plug. I use the continuous suture almost entirely, and I think a good deal depends largely upon the surgeon's method of employing it.

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DR. HORSLEY (closing).—Dr. Palmer Dudley and Dr. Carr have said almost exactly what I was going to say in regard to Dr. Finney's objections.

As nearly as I can understand, the chief objections seem to be: first, the approximation is not so accurate, and, second, that a continuous suture constricts the lumen of the bowel. The continuous suture can be applied just as neatly as the interrupted, and much more quickly. I think if anyone here cares to perform experiments similar to those I have just reported, he will find that the peritoneum must have some reason for adhesion. That is one of the main points I tried to make. In other words, wherever there is adhesion of the peritoneum there must be some previous trauma, either bacteriological or mechanical. When you use sutures, trauma is done to the tissues, either with the bite of the suture, by the thread, or by the puncture of the needle. Between the interrupted sutures, healing takes place by the extension of the hyperæmia of repair. A continuous suture makes pressure at every point. There is no essential difference in principle between uniting peritoneum and uniting skin, if both are healthy.

As to constricting the lumen of the bowel, of course some is obtained, but, as Dr. Mixter has pointed out, if not too much diaphragm is turned in, the constriction is comparatively insignificant. It is nothing as compared with that produced by the Murphy button, in which the diameter of the bowel is greatly decreased, and yet obstruction very rarely occurs. Dr. Mall, of Johns Hopkins, conducted a series of experiments along this line, and my recollection is that in five or six weeks he found that the mattress suture, as used by Halsted in intestinal work, gave way and the bowel stretched, practically unfolding the diaphragm. Some other investigators have proven that this does not happen in every case; but it does in some, as Dr. Mall has shown in the *Johns Hopkins Bulletin*. If that happens with the interrupted suture, it also happens with the continuous suture. In one of the photographs which I have passed around, at the end of eighty days the continuous suture is seen almost entirely embedded in the paraffin cast of the lumen of the bowel. Dr. Evans, of Chicago, has pointed out that a constriction of this kind is not usually a vicious one. If the continuous suture is kept taut—and that is a point I tried to make in the paper—and accurately applied, you can regulate the amount of constriction so it will not be excessive.

Dr. Finney has called our attention to a very difficult feature in these operations, and that is uniting the mesenteric borders. In order to obviate this difficulty, he resorts to lateral anastomosis. Of course lateral anastomosis has a great many advantages, among others those he has mentioned, and the large opening that can be made. But I believe it is pretty generally conceded

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that the opening from a lateral anastomosis has a tendency to contract much more than an end-to-end union. There is certainly more trauma done in lateral anastomosis, and a much greater area of raw surface left for adhesions and kinking afterward. There is not only the trauma due to resection of the intestine, but from making another hole in each bowel, and closing the ends. There is more raw surface for adhesion around the lateral anastomosis than around an end-to-end union, to say nothing of the closed ends.

As to angulation, I may say that this picture (pointing to picture) was drawn by an artist who saw some of the experiments, and it represents fairly well the angulation which is ordinarily obtained. The angulation may be greater or less. As Dr. Carr has pointed out, the angle is probably never greater than a right angle. I find that, in uniting the colon to ileum, it is not greater than a right angle, which is in exact imitation of nature.

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INTESTINAL OBSTRUCTION.

By Dyer F. Talley, M.D.,
Birmingham, Ala.

The subject of intestinal obstruction is one which cannot be too frequently presented to the medical profession, and one with which it can never become too familiar. Indeed, it is a condition which presents many difficulties in its early diagnosis, and it is a well-recognized fact that in acute cases the life of the patient depends on early recognition and prompt surgical intervention.

The alarming fatality of this condition is too generally looked on as a natural and expected termination, and it is time that physicians wake up to the realization that practically every case can be saved by prompt action directed in the proper line of treatment.

Rather recent statistics show that of operated cases nearly 50 per cent. prove fatal; the cause of this high mortality is delay in operating, waiting until the patient's vitality is overcome by the absorption of poisonous products, and until the pathological changes become so extensive as to get beyond relief.

There are two difficulties in the way of early operation: first, it is hard to make a positive diagnosis in the first twenty-four hours, indeed, in some cases impossible unless an exploratory laparotomy is done; secondly, there is a tendency on the part of the patient, his friends, and also the physician to wait till to-morrow and see what purgatives and enemata will accomplish. When a patient suffers extreme pain in the abdomen, especially in the epigastrium,

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which is not relieved by an ordinary dose of morphine; when he vomits and his bowels do not respond in ten to fifteen hours to the usual purgatives and enemata, we should diagnose intestinal obstruction; then if we err in our diagnosis the error will be on the side of safety for the patient.

If the proper care is taken in opening the abdominal cavity no harm will be done; so it would be better to open many cavities and find no obstruction than to fail to open one in which an operation is the only means of saving life. In practically all of these cases where no obstruction exists, some other condition is found requiring operation. In nearly all diseases and conditions an operation is looked on as a last resort, while in this condition it should be considered the first and only means of relief. The few cases that we read of having undergone spontaneous cure should not be considered, for the faint hope inspired by them will cause more deaths in a month's time than it will cure throughout eternity. To meet the second difficulty it is necessary for the physician to inform the patient or his relatives of the danger and fatality of the condition and to firmly insist on an operation. If the operation be refused the proper thing for the physician to do is to give up the case, for he is not only morally but legally responsible for treating a case improperly, even if it be in accordance with the wishes of all parties concerned.

In order to get more practically at the subject, I will report the cases that have come under my care during the last fifteen months:

Case I.—Mrs. H. M., aged forty-six years, on the night of July 7, 1903, had a severe cramping spell, when a nearby physician was called and gave a hypodermic of morphine; she was only partially relieved by this, and I was called early on the morning of the 8th; at this time she was suffering great pain in the epigastric region and had vomited several times. She had eaten some indigestible article of food the night before, and as the pain was confined strictly to the stomach it impressed me as a case of acute indigestion.

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During the day her pain was so great that a grain of morphine was given and that amount did not entirely relieve her. A moderate dose of calomel was given and followed by salts, but her bowels did not respond; high enemata were given during the day with no result, but as so much morphine had been administered it was thought that bowel action would be slow.

On the second day she grew very weak and pulse ran up to about 160 per minute; she was given normal salt solution by hypodermoclysis, which brought her pulse rate down to 120, and she appeared much better. She vomited at intervals through the day, but did not suffer very much pain; only two small doses of morphine were given; abdomen was sensitive in epigastric region, but there was no distention; several high and stimulating enemata were given with no result.

On the third day she was still vomiting and abdomen began to swell; about noon a small fecal action followed a high enema.

The fourth day her abdomen was very much swollen and rigid and peritonitis symptoms marked; it was very evident that death would soon follow unless the obstruction was relieved, and even then there was little hope. I rather favored operation as the only hope, but consultation advised against it and patient was kept as quiet and comfortable as possible on hypodermics of morphine. On the next day the vomited matter had a decided fecal odor and this continued until her death on the ninth day of the attack.

This case is a sad one to relate, because it could have been relieved by timely operation; and yet it is a very instructive one, for several reasons. In the first place it was a very deceptive one to begin with, for one not thoroughly familiar with the aberrant symptoms of intestinal obstruction. For instance, the pain during the first day or two was confined to the stomach or epigastric region, while the constriction was low down at the pelvis; on the third day there was a slight fecal movement which came from below the obstruc-

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tion, but which inspired a false hope that the obstruction had given way. On post-mortem it was found that three or four feet of the ileum was caught up and strangulated by an adhesive band anchored to the promontory of the sacrum. There were extensive adhesions in the surrounding intestines. This patient had been operated on a year before, when the uterus was removed.

CASE II.—Mrs. S. P., aged sixty-two years, had been suffering pain in region of right groin for several days when I saw her; on examination I found a hard tumor in groin about the size of a walnut; her bowels had not moved since the appearance of this tumor. I operated on June 12th and found it to be a femoral hernia; the bowel was somewhat discolored, but appeared healthy after the constriction was relieved, and was returned to the cavity and the canal was closed. This case progressed nicely, bowels moved well, but on the fifth day she became suddenly worse and died in a few hours. As no post-mortem was allowed I could not determine the cause of death. She gave no evidence of peritonitis; so I thought possibly she died from embolism.

CASE III.—Mrs. A. G., aged thirty-four years, had severe cramps in epigastrium on Friday night, November 20, 1903. I was called in consultation on the afternoon of the 23d, when patient said her pain had stopped rather suddenly that morning and that she would feel all right if her stomach could be settled. I learned from the attending physician that she had been vomiting occasionally since the attack began; she had also suffered considerable pain in the epigastrium, for which he had given morphine repeatedly; he had also given calomel, salts, and numerous enemata, which failed to move the bowels. On examination I found little distention of the abdomen, but the walls were rigid, showing peritoneal involvement; her pulse was 130 and temperature 100.4°. Facial expression rather pinched and indicative of serious trouble. I diagnosed intestinal constriction with gangrene, and the patient was as soon as possible placed in an ambulance and carried a distance of five miles to the

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hospital, where I operated as soon as preparation could be made. When making the abdominal incision as soon as the peritoneum was reached, dark, gangrenous fluid came welling up through it, and on opening the cavity it was found filled with this foul-smelling fluid, which had a decided fecal odor. The obstruction was readily found and consisted of a loop of ileum constricted by an adhesive band, which was bound down near the vertebral column not far from the sacrum; there were also adhesions between the left Fallopian tube and the intestine, outside the constriction. She gave a history of tubal trouble for several years previous. This constricting band was broken and the bowel liberated from the tube, after which it was easily brought out and the gangrenous bowel resected, which was twenty-four inches in length; the anastomosis was made with the Murphy button, the abdominal cavity flushed with normal salt solution, left full of the solution, and closed without drainage. This patient was in rather a critical condition to undergo a radical operation; so she was given a large quantity of salt solution both by hypodermoclysis and intravenous injection in order to avoid, as much as possible, the shock attending operations of this kind, which so often proves fatal. She left the table in a fair condition for recovery, and, although very weak for twelve hours, never suffered another moment's discomfort, as her nausea and vomiting was entirely relieved. Her bowels moved on the third day after operation and she progressed nicely until the ninth day, when a fecal fistula formed in the lower angle of the abdominal incision; the button could be felt with a probe in this fistula; on the twentieth day of the operation the fistula was enlarged and the button removed, after which the fistula closed. I discovered after removing the button that it was the large size, usually employed in the colon, which my assistant gave me by mistake, as I asked for the medium size. I believe if the latter had been used there would have been no fistula. This patient was in excellent health and doing all her housework when last heard from. This case is instructive in that it

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shows that extreme conditions may be relieved and the patient cured even after gangrene has set in.

Case IV.—J. D., colored, aged thirty-eight years, had cramping pains in abdomen for several days, during which time strong purgatives had been given with no effect; he had vomited occasionally during this time. When I was called to see him abdomen was somewhat swollen but soft, temperature normal, and pulse about 100 per minute and good. This patient had part of a rib resected ten days previously for tuberculous trouble. The symptoms of obstruction in this case were not alarming, but the distention, pain, and inability to get a bowel movement led me to open the abdomen, and I found a band extending from a cluster of tuberculous glands of the mesentery to the convex border of the ileum, which had the effect of reining the intestine down without constricting it; this band was broken and some adhesions between intestinal loops relieved and the abdomen closed. I did not see the case after the operation, but was informed that his bowels moved four or five times on the night after operation, and he had an uninterrupted recovery.

Case V.—L. J., aged fifty years, had worn a truss for complete inguinal hernia for thirty years; on the morning of February 2, 1904, he got up to answer the telephone without putting on his truss and the hernia came down; in a few minutes it commenced to pain him, and when he returned to the bed it would not reduce. I was called to see him and administered morphine; after he got easy I employed gentle manipulation, but with no effect. I do not spend much time trying to reduce hernia, for two reasons: first, I do not believe in manipulating a strangulated bowel, and, secondly, every one who has a hernia and can stand an operation is entitled to a radical cure. This case was carried at once to the infirmary and operated on in six or eight hours after the bowel came down, and at this early time the bowel was turning dark and fluid had collected in the sac; after relieving the constriction the circulation returned and the intestine was returned to the cavity and a radical operation completed.

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He made a perfect recovery and has gained about twenty pounds over his usual weight, and feels better than he has for years.

CASE VI.—Miss S. B., aged twenty-eight years, was suffering severe cramps in region of the appendix, and had been for about one week when I saw her, on May 8, 1904. The diagnosis of appendicitis was made and she came to my infirmary, where I removed the appendix on the 11th; she continued to suffer about the same pain after the operation, and in the course of a week she grew worse, abdomen commenced swelling, and bowels could not be moved. By the ninth day she was in a critical condition, abdomen so distended that respiration was very much embarrassed, and her facial expression was one of great distress; she was also vomiting almost continually; it was evident that she could not live much longer unless relieved, so I opened the abdomen and relieved what must have been a volvulus, as the act of pulling the bowels out of the cavity relieved the obstruction; the colon was collapsed and the small bowel very much distended until the obstruction was relieved, when the colon became distended. She made a satisfactory recovery.

CASE VII.—C. N., male, aged six years, commenced having pains in abdomen on May 28, 1904. His father, a physician, started him on calomel and followed with other purgative medicine, but he failed to get bowels moved in thirty hours; so he feared obstruction and hastily brought him to the infirmary.

When I first saw him, on the 31st, he was getting weak, had an anxious expression, and pain or cramps in bowels, but the abdomen was not rigid. I considered it a case of intussusception and operated as soon as preparation could be made; four distinct intussusceptions were found in the lower part of the ileum, within three feet of the cæcum; these intussusceptions involved from three to four inches of bowel in every one; no adhesions had formed, so they were as easily relieved as pulling out an inverted glove-finger. The appendix was near at hand, and, as it looked somewhat

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enlarged, was removed and the abdomen closed. The mesenteric glands were very much infiltrated, showing a tuberculous condition, which condition was responsible for the whole trouble. Only one case of fourfold intussusception is reported in the literature on the subject, and it is extremely rare to have more than two or three; usually only one is present. This little fellow's bowels moved in a short time after the operation, the vomiting stopped, his expression changed to normal; he recovered rapidly and was sent home on the nineteenth day of the operation; he has gained considerable flesh since and feels well, but still runs some temperature owing to his tuberculous condition.

Case VIII.—M. T., male, aged five months, commenced suffering with cramps on June 10, 1904; small doses of calomel were given, as is the custom in intestinal disorders of children, but there was no response; other purgatives and numerous enemata were given with no result.

I saw the child in consultation on the 13th, three days after the onset of the attack, and found him vomiting, with rigid abdomen and distressed facial expression. Intussusception was diagnosed and baby was carried at once to the infirmary for operation. He took the anæsthetic badly, and just as the skin incision was made he stopped breathing and artificial respiration had to be employed for some minutes before he was resuscitated. It looked as though the chloroform would surely prove fatal; so I abandoned the operation on the frail hope that the trouble would relieve itself; so the skin cut was closed with a subcuticular suture, the child put to bed, and enemata again tried. During the next day he grew worse and by night I was fully convinced that he would die in a short time unless relieved, and I decided to complete the operation with local anæsthesia.

When I started the operation the hypodermic syringe had been cracked by sterilization and I did not have any time to spare; so proceeded without any anæsthesia. The subcuticular suture was pulled out and the wound easily opened down to the fascia, the abdomen was gotten into with apparently

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little pain to the child, and as soon as the cavity was opened a large portion of the intestines protruded; the intussusception was found to be one of the ileocæcal variety and was easily relieved, although some adhesions had formed.

A large amount of gas passed as soon as the obstruction was relieved, but great difficulty was experienced in returning the intestines to the cavity, as the child was straining with all his might; however, this was soon accomplished, and the incision closed. The little fellow passed considerable gas all night and was decidedly more comfortable than before the operation. On the next morning he had a satisfactory fecal action, but soon after this he commenced growing weaker and died in fifteen hours after the operation.

This case would have been saved had the operation been completed on the first night, and I would have finished it that night without an anæsthetic had I not been informed by text-books that a good percentage of intussusceptions relieved themselves.

This case shows that a laparotomy can be done without anæsthesia, and many cases that are seen late and are too weak for an anæsthetic may be operated on and relieved without a general anæsthetic.

DISCUSSION.

Dr. Guy Le Roy Hunner, of Baltimore, Md.—I have been very much interested in the report of these cases of intestinal obstruction, and their narration by the essayist points out one thing of importance, namely, that we should not delay operating on these cases. My experience with cases of intestinal obstruction has been principally with postoperative obstruction, and you all know how anxious it makes a man to have difficulty in getting the patient's bowels to move in the first few days after an operation, and how strong the tendency is not to operate a second time. But from a large experience with hospital patients, who have had intestinal obstruction, I have come to the conclusion that I would rather err on the side of going in occasionally unnecessarily, than to err in the other way and be too late. I have one observation to give you. I was reminded of it about ten days ago, on seeing a patient opened up forty-eight hours after operation because of intestinal obstruction. The operation had been

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one of the simplest character, the removal of an ovarian cyst, and on operating the second time it was found that by slipping the hand over the uterus, at the site of the ovarian stump, the intestine was easily brushed free from its adhesions found at that place. I had a similar case during my experience in the hospital in which I had every reason to suspect the obstruction was at this point, and therefore, instead of making a second laparotomy, I examined the patient through the rectum, and swept my finger up over the utero-ovarian region, and loosened the adhesions. My point is this: If we have operated in the pelvis and got post-operative obstruction or symptoms of it, we should very early make a rectal examination and sweep our finger thoroughly over the region of the operation. In this way, I am sure, we can save some such cases from undergoing a secondary serious operation.

Dr. W. P. Carr, of Washington, D. C.—This subject is so important that I hope it will be freely discussed. We all see a great many cases of intestinal obstruction, and frequently it is very hard to make a diagnosis in time to operate safely. The more I see of intestinal obstruction, the more I am convinced that whenever there is a strong suspicion of it, we ought to make an exploratory operation. There are so many cases that have little or no symptoms for quite a while, and so many cases of rather high obstruction that have considerable fecal movements from the lower bowel after the obstruction takes place, that we are apt to be misled. I have been misled a number of times. I have been called in to see several cases, where the patient seemed so much better that I have put off operation, and shortly seen him collapse suddenly. Possibly there would be the passage of fecal matter, following which the patient would experience great relief. But in nearly all of those cases there was suddenly collapse, and after this collapse there would be no chance to operate. I have had a number of cases that would seem to be improving, getting along very well, and have slight bowel movements, and express themselves as feeling better, and even the pulse was better, and yet within fifteen or twenty minutes they would go into collapse and get into a condition where operation was useless. On the other hand, I have operated on some cases when I was not at all sure there was any serious trouble, and have found extremely bad conditions of the bowel. Sunday afternoon, before leaving home to attend this meeting, I operated on a man who had symptoms of intestinal obstruction. He was a patient in the Emergency Hospital; he was in such an apparently good condition that I hesitated to operate. He had had several small movements of the bowel; his pulse was only 100, and his temperature normal. He looked strong and well. We could hardly keep him in bed, as he wanted to get up. He was passing urine every five minutes, a little at a time. We tried to pass a catheter and found that he had a tight stricture. He gave a history of tertiary

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syphilis. The bridge of his nose was sunken in. After getting the man on the operating table and dilating the stricture, and finding the bladder not distended, I opened the abdomen, and I must say I have never seen a worse-looking abdomen in my life. He had syphilitic disease of the liver, spleen, and kidneys, and the mesentery was infiltrated everywhere with gummata. The intestinal walls were full of gummata, and the whole bowel was red and inflamed from the stomach to the anus. There were large numbers of recent adhesions, which were easily broken up. It was an instructive case to me. The man had no tenderness over the abdomen. You could press anywhere without eliciting tenderness, and yet he had this very badly inflamed intestine. There were adhesions and obstructions in several places in the bowel. Whenever we have a strong suspicion of intestinal obstruction, particularly where vomiting is persistent, an exploratory operation is much safer than to let the patient go on without operation.

Dr. J. Garland Sherrill, of Louisville, Ky.—This subject is one of the greatest importance. I think that we all agree with the statement that an early operation is to be advised in intestinal obstruction. I think we may safely say that whenever a patient his an intra-abdominal pain which is not promptly relieved, an exploration should be made.

The remarks made by Dr. Carr prompt me to emphasize the danger of sudden cessation of pain. Whenever we have a severe pain in the abdomen cease suddenly, it is extremely likely to be the result of gangrene of the gut, and for that reason the case demands very prompt operation. Many of these patients can be saved by opening the abdomen at once, even in the presence of shock, and in this way we can avoid general inflammation of the peritoneum.

Dr. Hunner's case of obstruction following operation calls to mind one I saw in which a diagnosis of intestinal obstruction was made, and yet after opening the abdomen the obstruction was not discovered immediately. But marked inflammation was observed in the abdominal cavity, and especially in the neighborhood of a small ovarian cyst. This cyst was removed, and yet I felt there was something else which caused the obstruction, and it was not simply due to paresis of the intestine, the result of inflammation. I therefore proceeded to search for the obstruction, and was fortunate enough to find it and relieve the patient. This kind of a case points out that we should not too hurriedly accept the idea that paresis is the cause of the symptoms of obstruction, but should search thoroughly for this obstruction.

In regard to a secondary operation for obstruction of the intestine, I was impressed with the remarks of Dr. Hunner on that point, and think they are worthy of emphasis. I remember

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operating on a patient three weeks after being sent home apparently well from an appendicitis operation, and found a band obstructing the gut. It is true, we are loath to make a second operation when we have already performed one, because more or less criticism is made, the impression being on the part of the laity that the second operation is done for the relief of the bad result from the previous one.

Dr Charles L. Bonifield, of Cincinnati, Ohio.—We can find no fault whatever with the conclusions of the essayist, and his paper was an admirable one. I wish to refer to the case of the child in which, on account of its being unable to stand the anæsthetic (chloroform) the operation was stopped and deferred until the following day. The suggestion I would make is that Dr. Talley should have tried ether. I have a number of times in children, when they acted badly under chloroform, changed to ether with the happiest results. That anæsthetic not only does not depress but it acts as a stimulant to these cases. In any case where one anæsthetic acted badly I should try another before proceeding without one or deferring the operation.

Dr. W. O. Roberts, of Louisville, Ky.—I have had occasion to operate for postoperative intestinal obstruction in a case of what was a simple ovariotomy. I could not understand the cause of the obstruction, but after opening the abdomen I found the woman had a diverticulum, which was stretched over the gut and had produced complete obstruction, the relief of which brought about a perfect cure.

In reference to the case of intussusception in a child mentioned by Dr. Bonifield, it calls to mind a case I operated upon. The patient was a girl, nine months old, who was being treated for dysentery. I was called to see the child, and found there was a considerable amount of distention, with great straining on part of the child, and bloody mucus being passed by the bowel. I introduced my finger into the rectum, and found an intussusception. The mass was within two inches of the anus. I advised laparotomy, which was consented to and performed, and I found that the intussusception began at the ileocæcal opening and went clear within two inches of the anus. It was easily relieved. The child, however, died in the course of twelve hours from shock.

I think it is very important in all cases of obstruction of the intestine to examine the rectum carefully.

I was called not a great while ago to see a man who had been in good health, a strong, robust-looking fellow, who had symptoms of obstruction which came on suddenly. On passing my finger into the rectum I met with a stricture very high up. I opened the abdomen and found that he had malignant disease of the sigmoid. This man had given no symptoms whatever of malignant disease prior to the onset of the obstruction.

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Dr. William E. Parker, of Hot Springs, Ark.—There were two or three points that impressed me as this paper was being read. One of them was, that in an Association of the standing of this we ought to make a special point to impress upon the general practitioner the importance of an early diagnosis in cases of intestinal obstruction; and if there is any question at all, to call in a surgeon, a man who has had experience in this class of work; because I know of no branch of surgery in which an early diagnosis is so important, and then, after it has been made, opening the abdomen and getting out of it as quickly as is consistent with good work.

As to the question of anæsthetics, I agree with Dr. Roberts that under the circumstances, after the boy had reacted from the chloroform, I should have attempted to finish the operation under ether.

My experience has been that those patients requiring an abdominal operation, who cannot stand a general anæsthetic, whether it be ether or chloroform, are seldom relieved by cocaine, and it may be well in some instances to do the operation without any anæsthetic at all. Cases that are so far gone as this one was are seldom relieved.

Another point that struck me was this: Take a good many cases of hernia and some cases of obstruction of the bowel, and it is sometimes surprising to see the amount of pressure the gut will stand, and how it will react after the pressure is relieved. I have been specially impressed with that in a number of cases of hernia in which the gut was absolutely black, and it would seem that there was nothing to do but to make a resection, but after the pressure was relieved the color would return to the gut and the patients would go on and get well.

Dr. William P. Nicolson, of Atlanta, Ga.—I desire to call attention to one or two points; the first, the significance of abdominal pain. We should always bear in mind that the location of a pain in the abdomen bears practically no relation to the location of the lesion itself in many instances. Another point is that any patient who has a severe abdominal pain that is not relieved by two or three doses of morphine, and especially one that does not remain relieved by morphine, and needs a repetition of it, has not a case of indigestion, and that there is something more serious.

There is one point that has been impressed upon me, to which I desire to call attention, and that is the tremendous danger, in operations for intestinal obstruction, from fecal vomiting, and the importance of washing out the patient's stomach before beginning the operation. I had the misfortune to operate on a young woman for intestinal obstruction, in a town some distance from my home, where the patient during the operation had copious fecal vomiting, some of which was aspirated into the lungs. She left the operating table in good shape, had a good

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pulse, and with indications that she would be all right; but within a short time she became intensely cyanosed, with rapid breathing, pulse increased in rapidity, and, although remaining perfectly conscious, she died within two hours. Upon my return home I picked up the current issue of the *Annals of Surgery*, in which I found an article upon the subject of "Drowning the Patient in Fecal Vomiting," the author (Dr. E. Wyllys Andrews, of Chicago) reciting a number of cases where exactly the same experience had taken place in every instance, and it was practically fatal within a few hours. There was aspiration of the fecal vomit into the lungs. My patient's stomach was not washed out because she had just before the operation most copious emesis —I suppose a quart or two of this matter, and the rapid accumulation of it was a great surprise. But I am satisfied that death was due directly to the aspiration of the fecal matter into the lungs. Since then I have seen it noted a number of times in surgical literature, and, it seems to me, it is a matter of great importance, in that we lose patients by something that can be prevented in that way. Undoubtedly, the intense poisoning of the fecal matter aspirated into the lungs brings on the cyanosis, as death in all of the cases was practically identical, these being the symptoms: Rapid collapse, rapid breathing, intense blueness of the skin, with the patient dying conscious in every instance.

Dr. Talley has had a remarkably rich experience in cases of intestinal obstruction, in that he has reported so many cases representing a period that covers only eighteen months. People over this way must get intestinal obstruction frequently. His experience has been valuable and unusual, as far as it runs in the territory from which my humble work is drawn, and certainly valuable lessons can be learned from the recital of his cases.

I agree with Dr. Parker, that the profession should be educated to the point that any persistent abdominal pain, with the absolute refusal of the bowels to move from large doses of purgatives, is a danger signal held out by nature, and when disregarded the future fate of that patient lies with the person who disregards those symptoms that the essayist brought out so prominently at the onset, and it is simply a question, probably, that the patient is going to die, and let us do what we can to save his life, if possible. If there is anything known in surgery, it is that prompt action in cases of this kind means so much.

Dr. Samuel J. Mixter, of Boston, Mass.—Considerable has been said in the discussion with reference to early operation in cases of intestinal obstruction. Unfortunately, we cannot choose our cases, and it is not our fault that we are called upon sometimes to operate late. I want to say a word or two about late operations for intestinal obstruction, the unavoidable late operations, because we have not seen the patient before. Given patients who have had intestinal obstruction for days, and are

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in a very critical condition, I think many of them can be saved if too much is not attempted, and the reason we kill so many patients is because we attempt too much. Take any case of gangrene following obstruction by a band or intussusception; if a simple opening is made in the abdomen, and the most distended loop of bowel is found, a tube tied in and the intestine drained and the region of the trouble packed, later an operation can be done and the patient saved; whereas, if you attempt to do a resection or a serious operation at the time, the patient will surely die.

Dr. A. Palmer Dudley, of New York City.—I wish to call attention to an important point in connection with what the essayist said concerning morphine, and it is this: that the surgeon is under the greatest disadvantage on seeing a patient when the family physician has given a big dose of morphine to allay pain. The patient is comfortable, and when the surgeon is called in everything is masked by the condition which the morphine has produced. Peristalsis is arrested, and the obstruction goes on more rapidly than if the patient had not been given a dose of morphine. I have not given a dose of morphine in fifteen years to any patient on whom I have made an abdominal section. I think that point is one of the most important ones brought out in the author's paper. The symptoms of intestinal obstruction are masked by the administration of morphine, and it is one of the most dangerous agents I know of in abdominal surgery.

Dr. Talley (closing).—I wish to thank the Fellows very much for their liberal discussion of my paper. As Dr. Hunner has said, we are always a little slow to operate for postoperative intestinal obstruction. We dislike very much to subject the patient to a second operation so early. Furthermore, the patient and friends feel that the first operation caused the trouble; yet that is a reason why we should operate early and save the patient, if possible.

The point I wanted to impress was the importance of early operation, because I believe, as all of you do, that many of these cases can be saved if they can be gotten at early enough, and promptly operated upon. As Dr. Mixter says, frequently we do not see the case until it is in an extreme condition, and we may have to resort to an operation which requires very little time, such as the making of an artificial anus, and later on doing a more radical operation. I believe that in all those extreme cases, if we employ hypodermoclysis, or if we fill the vein with salt solution before the operation begins, and give the salt solution during the operation, we can operate on patients who would otherwise die on the table, because we avoid shock by it. I have noticed in a good many desperate cases, where the patients received hypodermoclysis before and throughout the operation, they would come off the table with a better pulse than when they went on.

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Dr. Carr says that there is a good deal of difficulty attending early diagnosis, and that sometimes we are called to see patients when they feel much better, as in one of the cases I reported. In this case the woman said she was feeling all right, and would be practically well if her stomach was settled. She had two feet of gangrenous intestine at that time.

In all of the cases I have seen, pain has been in the epigastrium, no matter where the site of obstruction was. It is misleading on that account. This case was also an instructive one to me, on account of the involvement to a greater or less extent of the whole peritoneum; that is, the whole peritoneum looked dark; it had an unhealthy appeaance, and before I went through the peritoneum this gangrenous fluid appeared as soon as I got down to it. I dissected off a good deal of the peritoneum, thinking I was inside, on account of the fluid welling up from the parietal wall before I discovered I had not gotten into the cavity, thinking I had extensive adhesions to deal with. In spite of that, the peritoneum came out all right. I flushed out the cavity, filled it with normal salt solution, and closed without drainage. In a peritoneum of that kind I did not see the necessity of draining it unless I could drain the whole surface; that could best be done by leaving the abdomen full of salt solution.

In regard to the child five months old, I lost it because I did not finish the operation when I started it. I have thought since that I should have changed to ether anæsthesia. I know I should have done so, or gone on and finished the operation without an anæsthetic. Of course, we are usually taught that a child will take chloroform better than ether. I know that many patients will take ether better, and it will stimulate them instead of depressing them as chloroform does.

As I have previously remarked, the main point I wanted to bring out in the paper was the importance of early operation, and to operate before one makes the diagnosis, so to speak, if the case is complicated and you cannot decide what you have. You can always decide that you have some serious intra-abdominal condition, and it is better to open the abdomen and deal with the case intelligently than to go on not knowing what you have.

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A REVIEW OF ONE THOUSAND OPERATIONS FOR GALLSTONE DISEASE, WITH ESPECIAL REFERENCE TO THE MORTALITY.

By William J. Mayo, A.M., M.D.,

and

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From June 24, 1891, to December 1, 1904, we have made 1000 operations upon the gall-bladder and bile passages, with 50 deaths (5 per cent.). About 95 per cent. of the cases were operated upon in St. Mary's Hospital, and under nearly identical conditions.

In a rapidly growing field of this character there have necessarily been many changes in technique. For such improvements we are much indebted to the literature of the subject. We have benefited from the work of Murphy, Ochsner, Elliot, Richardson, Park, Bevan, McBurney, Halsted, and a host of others, and especially from the late W. E. B. Davis. To Robson, Moynihan, Kehr, and Reidel we wish also to acknowledge a debt of gratitude.

A study of mortality must be based upon some definite plan, and so far as the writers know there is no settled method upon which a correct estimate of the death rate in any series of operations can be compiled. What are we to understand by a mortality of a certain percentage? Some operators say that if a patient dies as a result of the operation itself it should be counted, whereas if the operation failed and the patient continued along for a time, then died from the disease or of a complication, it should not be charged to the opera-

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tion. The defect in this method is that it allows of a large degree of personal equation, and the same statistics may be made to look very well or very badly as the critic is prejudiced for or against the operation. One very prominent operator declares that any individual dying within fourteen days from any cause should be attributed to the operation, and after that time it was a question to be settled by the judgment of the surgeon. In this series of cases we have taken the view of the layman, that if the patient goes into the hospital alive and comes out dead the death resulted from (or in spite of) the operation. It is to be understood, therefore, that in estimating the death rate we have charged as a death from operation every patient who died in the hospital, without regard to cause of death or the time which elapsed between the operation and the fatal issue. It includes patients dying as long as three months after operation, and from intercurrent disease or accidental cause, such as apoplexy, pneumonia, heart disease, chronic nephritis, etc. A percentage of the deaths could be fairly excluded, but as the object is to show the relative curability of gallstone disease rather than good statistics, we have concluded that the above method is at least unprejudiced. It undoubtedly has a tendency to exaggerate the dangers of operation, particularly in common-duct disease where long-continued infections of the bile passages have resulted in blood changes causing death at a late period. But it also illustrates the dangers of delay and the tendency to produce complications which operation may be unable to relieve.

In the 1000 operations there were 50 deaths in the hospital, or an average death rate of 5 per cent. In the benign series there were 960 cases, with 4.27 per cent. For malignant disease, 9 deaths in 40 operations gives a mortality slightly in excess of 22 per cent.

Where the disease was limited to the gall-bladder, including all non-perforating infections, the mortality was 2.44 per cent. There were 573 cholecystostomies, mortality 2.46 per cent.; 186 cholecystectomies, mortality 4.3 per cent. This

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does not include 101 cholecystostomies and 44 cholecystectomies performed as part of a common-duct operation. We have followed the rule of counting as one operation all the different procedures done through a single incision. The major or most serious is classified; the others are considered secondary and appear only in the record of the patient.

Of the common-duct operations there were 137 benign with 16 deaths, 11.7 per cent. This gives a heavy mortality, but, as already pointed out, it is really a death rate of operation and disease and means that 7 per cent. failed to recover from the direct results of the operation; that is, died within a few days; while 4 per cent. recovered from the operation, but did not regain sufficient strength to leave the hospital. Many cases operated were in desperate condition from prolonged icterus, anæmia, etc. No cases were refused operation if they so elected after a fair statement of the facts. Operations for malignant disease are discouraging, 40 operations with 9 deaths in the hospital, and of those that recovered comparatively few received sufficient palliation to repay the immediate risk, suffering, and expense. Two cases, however, can be considered favorable as to cure; both were instances of early carcinoma of the gall-bladder. In a few patients a thick-walled and functionally useless gall-bladder was removed and examination showed malignant involvement, and in the 2 cases referred to no return has as yet taken place after more than two years. We have recently had 2 cases of a like character, but as yet too early to be considered as to the probability of cure.

Next to malignancy and acute perforative infections of the gall-bladder and pancreas the most serious thing that can happen in gallstone disease is involvement of the common duct of the liver. Contrast a mortality of 2.44 per cent. in 820 cases where the disease was confined to the gall-bladder with 11.7 per cent. in 137 cases where the common duct is involved.

It would exceed the limits of this paper to go into the details as to various operations performed, and we will con-

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fine ourselves to a short discussion of the mortality in the benign group of cases, and a comparison of results after the three most common operative procedures: cholecystostomy, cholecystectomy, and choledochotomy. It can be fairly stated that the average mortality of operations for diseases confined to the gall-bladder is not greater than for appendicitis in patients of the same age and condition of health. Gallstone disease is most frequent in people of advanced years, often obese, and not infrequently the victim of some degenerative lesion of vital organs. One cannot directly contrast such cases with disease of the appendix, which is by far more common in younger and more robust subjects.

Cholecystostomy: Of these there were 573 (exclusive of 101 in connection with common-duct operations), with 14 deaths, a mortality of 2.46 per cent. This includes most of the acute infections with localized peritonitis. At least one-third of these deaths were from purely accidental causes that had to do with the general condition of the patient. The mortality of cholecystostomy in simple gallstone disease in otherwise normal individuals was less than 1 per cent. In 186 cholecystectomies (exclusive of 36 common-duct cases) the mortality was 4.30 per cent., or nearly twice that of cholecystostomies. It may be urged that this later operation was elected in the more severe cases, and to a certain extent this is true, but not wholly so, as the more dangerous acute infections were nearly always drained by cholecystostomy. Inasmuch as in not a single instance did stones reform in the gall-bladder when left, cholecystostomy must be considered the safe operation, cholecystectomy being reserved for certain cases in which cholecystostomy may be expected to furnish, in a considerable proportion of cases, a partial or complete failure. Other things being equal, all cystic gall-bladders should be removed, and especially when a stone is impacted in the cystic duct, as not infrequently a stricture may follow removal, interfering with the escape into the common duct of the normal secretions of the mucous membrane, thus giving rise to colics or external mucous

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fistula. As a rule, gall-bladders which are found to contain bile at the time of operation may be drained, as if bile can get through the cystic duct mucous secretion can escape. If the cystic duct should be considerably injured during removal of the calculus, introducing doubt as to the future permeability, the gall-bladder should of course be removed. Again, gall-bladders which are suspiciously thick and hard should be excised, as in this way early malignancy may occasionally be cured, as is shown in the two cases referred to above.

In most cases of chronic cholecystitis without stones the gall-bladder should be removed. The presence of gallstones gives rise to irritation, and their removal with subsequent drainage by cholecystostomy may be expected to leave a harmless organ, but an infection which is able to continue without the aid of foreign bodies calls for a more radical operation.

We must not be too ready to diagnosticate cholecystitis without stones on operation, or we may cover a mistake in diagnosis and send home an unrelieved patient with an unnecessary operation. Before a diagnosis of non-calculous cholecystitis is permissible the duodenum, stomach, pancreas, appendix, and right kidney must be examined, and if the theory is correct the gall-bladder should be found thickened, of light color, with the lymphatic glands along the cystic and common ducts markedly enlarged. It should contain tarry bile and the mucous membrane not only thickened, but covered with little fibrinous specks.

In patients who have gallstones and who have suffered from attacks of jaundice and other symptoms of infection of the common and liver ducts, but without stones in the duct, cholecystostomy is the operation of choice, as it furnishes bile drainage. Cholecystectomy, if performed in this latter group, should not be accomplished by ligating the cystic duct, as it may be vital to secure bile drainage, and the duct must be left open or, if necessary, split down to the common duct for this purpose. If the cystic duct is patulous

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cholecystostomy furnishes this drainage easily and safely, and in case of future common-duct stone the gall-bladder is a reliable guide to the common duct and greatly facilitates a secondary procedure.

It must be borne in mind that stones may form in the common duct secondary to an infection from gallstones in the gall-bladder, and especially so if a stone has passed through the common duct or has been removed from it. If has been urged that the gall-bladder in gallstone disease is obsolete and should be removed in every case. In our experience there has been a slightly increased hazard and without compensating increase in permanence of cure or shortening of convalescence in the average case. We find indications for removal of the gall-bladder in about 2 cases out of 5, but consider cholecystostomy the operation of choice, and only perform cholecystectomy for definite pathological conditions such as we have called attention to.

The most common cause of death where the gall-bladder alone was involved has been an ascending infection of the common and hepatic ducts. Cholangitis as a result of gall-stone disease at once introduces a most serious complication. As long as the stones are confined to the gall-bladder they are, so to speak, but a side issue to the possibilities of trouble engendered by lodgement in the deep ducts, for here infection is lighted up which may extend to the smallest bile-ducts, and over which, as compared with gall-bladder disease, we have but little control. A process is instituted which may result in stone formation even in the most minute bile-ducts, and future trouble after apparent cure may be the result. The death of 16 patients in 137 operations for gallstones in the common-duct series and 4 out of 9 malignant cases at once demonstrates the serious character of common-duct surgery. Not that the operation itself is particularly difficult nor prolonged, but we have two serious elements introduced, jaundice and infection; and the mortality, both immediate and remote, of choledochotomy depends almost entirely upon these factors. About one-third of all patients with common-

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duct stones have little or no jaundice at the time of operation and very little infection. However, at the time the stones passed into the common duct there will usually be found in the history that there had been both jaundice and infection, and during the acute stage operation would have been fraught with greater danger. During the quiescent period operation is very safe in such patients, and the mortality in our experience not more than 2 per cent.

Unfortunately, the majority of common-duct patients have either never had an intermission or have passed beyond it, and operation is no longer an election as to time, but a necessity, and, no matter how desperate, must be done to save life. In some cases the infection is the more prominent feature, giving typical ague symptoms. Sudden chills with high temperature, followed by rapid decline and a little temporary increase in jaundice, and attended with moderate pain and often nausea being pathognomonic. In others there is little infection, but such a degree of bile stasis in the ducts as to invite infection after any kind of operation. Some individuals are almost sure to die. Patients with extreme jaundice and subcutaneous hemorrhages will nearly always bleed to death from capillary oozing. If purpuric spots exist with jaundice we keep the subjects under treatment until the blood will at least remain in the proper channels. In all cases of jaundice we use chloride of calcium, following the advice of Robson for a few days before operation, but we are uncertain as to its exact value.

Another class of cases who have in our experience all died, and about whom we are not always able to foretell the conditions previous to operation, are those patients with obstructive jaundice in whom no trace of bile is to be found in the bile passages, the common and hepatic ducts being filled with clear fluid. The liver has been put out of action. The patient, while extremely feeble, may be up and about. The jaundice is extreme, but is not necessarily accompanied by leaky bloodvessels and subcutaneous hemorrhages. We have had four of these cases and all died within four days.

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In a few cases a little bile would appear in the drainage at the end of twenty-four hours, but in none did liver action become re-established.

In a number of instances the same condition was met with at an earlier stage, the bile-ducts being filled with thick, flocculent bile of a dark-greenish color, very much like that which occurs in the gall-bladder during the acute stage of cystic-duct obstruction, and before the pigments have become absorbed. In about half of this group the liver will begin to functionate and the patient recover. In reviewing the deaths in common-duct operations one is impressed by the influence of jaundice not only in vitiating the general health of the patient, as shown in the tendency to capillary bleeding, but even more important in the invitation which it extends to infection. Combined jaundice and infection is the cause of most of the late deaths from general debility and exhaustion which occur after a primarily successful operation. While we have had no cases in which stones have reformed in the gall-bladder after cholecystostomy, we have had two cases in which stones formed in the common duct after the removal of a single large stone from the gall-bladder in one case and in the other many stones from both gall-bladder and common duct, showing that stone formation may take place independently of the gall-bladder, but only when there has been primary stones in this viscus.

We have seen a number of cases of liver-duct stones, but there has always been a blocking common-duct stone from the gall-bladder at the papilla behind which the intrahepatic calculi had formed, the favorable condition of partial obstruction and mild infection furnishing the proper environment. In two cases we have had to operate a second time upon common-duct stones which had for their nucleus hepatic-duct stones which had drifted down into the common duct subsequent to the choledochotomy. In the 1000 operations 14.6 per cent. involved the common duct.

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DISCUSSION.

Dr. W. D. Haggard, of Nashville, Tenn.—I think the Fellows of the Association should feel greatly honored to have had the pleasure and privilege of listening to this admirable contribution. When we stop to reflect that it is the largest group of gall-bladder cases operated upon in the world, it is not difficult to draw the conclusion of the value of this paper. Only a year ago Kehr was able to report 720 gallstone operations. Here we have had a report of cases greatly in excess of that number, and the most important lesson to be learned from it, aside from the technical value it must be to each surgeon who wishes to discriminate between methods that are applicable to various pathological conditions, is the fact that gallstone disease without complications is a simple matter in surgery; that is, if it were not for infection and jaundice, the probabilities are the great majority of patients would get well. A mortality of only 1 per cent. in cases where the stones are limited to the gall-bladder leads to the general conclusion that the extension of operative relief to these cases, as the result of early diagnosis, is the feature to which we should direct our special attention. I think as our experience enlarges we will be able to diagnose these cases much more easily. We became suspicious of colics, of chronic indigestions, and of certain things that are treated medically for a long while; and the story of these cases, as developed from the patients themselves, is typical. Physical diagnosis does not amount to very much, and one is able to elicit a history from many of these patients which will serve as a guide in making an accurate diagnosis of the condition that is present. Aside from the jaundice and infection, the conclusion is drawn from this paper that operation on the common duct is attended surgically with very little more difficulty than an operation on the gall-bladder itself. Technically, it has been rendered simple by the enlarged incision of Moynihan, and the ability to take hold of the liver and rotate it upon itself; and by using the gall-bladder as a tractor the common duct can be pulled up to the surface, making it practically a surface operation. Technically, it is not much more difficult, and, surgically, the results are very satisfactory where there is no jaundice or infection.

In speaking of surgery of the common duct, I think it is a thing of which we should all be proud when we reflect that the greatest single contribution to the surgery of the common duct that has ever been made was worked out in this city, in which we have the opportunity of meeting to-day, by our distinguished and lamented Fellow, Dr. W. E. B. Davis. It was he who taught us the advisability, the safety, and wisdom of draining the com-

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mon duct across the peritoneum, and doing away with the attempt to suture the common duct.

Quénu and others learned the danger of attempting to suture the common duct, because Quénu cut down and removed sutures for drainage after a "biliary intoxication"; but Davis arrived at his conclusion by careful animal experimentation, and put the transperitoneal drainage of the common duct by gauge upon an enduring basis.

Dr. Rufus B. Hall, of Cincinnati, Ohio.—Like the previous speaker, I wish to congratulate the Association on having this excellent paper, which presents a large number of cases upon which operations were performed for gallstone disease. To me it has been a great treat, and I feel my inability to say very much in discussing it.

There was one remark made by the essayist to which I wish to refer. He said in his paper that in cholecystotomy he has not had a single patient who had a recurrence of stone. I have not made anything like the number of operations for gall-bladder diseases that the essayist has, but I have made quite a number of them, and I wish to report briefly a case upon which I operated about eight and a half years ago. The patient was a woman of thirty; she had sixty-six gallstones about the size of the end of my little finger. She had a stone in the cystic duct. She presented the characteristic symptoms; there was no difficulty attending the operation; the patient made a prompt recovery, and remained well for about six years. She was a widow at the time of the operation, married soon after it, and has borne one child. While carrying this child *in utero*, which is now twenty months old, she complained again of gall-bladder symptoms, and when she was about seven months pregnant, she had a sharp attack of pain, with distended gall-bladder. The gall-bladder was distended for a week or ten days, and finally she became so desperate that she insisted on a second operation. She entered the Presbyterian Hospital to have the operation performed; she lived in the country a short distance away, and the day she entered to get relief it was thought best to defer operation for a time. She was delivered a month or two afterward, and remained well until about three months ago, when she commenced to have repeated attacks of gall-bladder pain, with distention of the gall-bladder, and she entered the hospital with the gall-bladder enormously distended, accompanied with slight jaundice. Dr. Dandridge saw the case in consultation with me, and we agreed to operate. In this case I found a large stone about the size of the end of the index finger blocking the cystic duct, with innumerable small stones in the gall-bladder. There were more than a thousand counted. These varied in size from grains of sand to distinct stones. The patient has recovered. This is the only case in my own experience of recurrence of gallstones.

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DR. SAMUEL E. MILLIKEN, of Dallas, Texas.—We are very much indebted to the essayist, as not only the members of this Association, but those of other Associations, have been enlightened by the work of the Mayo brothers in the past, and personally I feel thoroughly repaid for having come here to listen to this very excellent paper.

Dr. Haggard emphasized one point which I want to second—the importance of our ability to thoroughly explore the common duct for obstruction, and it is practicable by a free incision to expose these common-duct obstructions, so that they can be actually photographed.

I was delighted to hear of Dr. Mayo's good results as to recurrence. I have had a limited experience in gall-bladder work, and so far I have had no recurrence of gallstones.

DR. J. M. T. FINNEY, of Baltimore, Md.—I want to take this opportunity to thank the Association for the honor and courtesy shown in granting me the privilege of the floor. I hesitate to speak again, lest I may abuse that privilege. However, it gives me great pleasure to congratulate the Association on being the vehicle of giving to the world this report of the Mayo brothers, which, as Dr. Haggard has said, is surely unequalled in the annals of surgery. I am sure, we are all proud to have as members these two men who have done so much for surgery not only in this country, but in the world. We are all impressed with the special characteristic of their work—honesty. That is the position they have taken in making this report of their cases.

It is with a good deal of hesitancy that I rise to discuss this paper, because of the limited personal experience I have had as compared with the Mayos. I can only say that our experience at the Johns Hopkins Hospital has borne out every point that Dr. Mayo has made regarding drainage and operations on the gall-bladder. There are definite indications for the removal of the gall-bladder, but those are limited, as Dr. Mayo has said, to gross lesions of the gall-bladder itself. It seems to me that the analogy some surgeons have drawn between the appendix and gall-bladder is not well borne out. Surely, there are a great many points of difference in the two structures, and a great many point in favor of leaving the gall-bladder.

I shall not attempt to discuss the paper in detail, but shall refer to one or two points. I have been interested in the question of the use of calcium chloride, and have had an opportunity to observe its use in a number of cases. I will relate one case:

A patient was sent to me who had been deeply jaundiced for some months. At the time of her arrival at the hospital she had bleeding from the gums, numerous petechiæ over the body, and had one or two hemorrhages from the rectum. I put her on calcium chloride for the greater part of a month (I have forgotten the exact time), and during that time she was under close obser-

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vation. We regularly tested the coagulation of the blood; it gradually decreased; in the mean time the petechiæ and hemorrhages disappeared, and she seemed in fairly good condition for operation. I operated, and found the whole gall-tract from the duodenum to the cystic duct packed with gallstones. She made an uninterrupted and good convalescence for two weeks, when the house officer reported one morning that he had noticed a hemorrhage from the wound. I examined her and found a slight oozing from the bottom of the wound. The calcium chloride had been stopped a week after the operation. The next day she had some bleeding from the gums, and the bleeding from the wound persisted in spite of everything. Later on hemorrhage occurred from the vagina and rectum, and finally she died in the course of a week. We were able to secure an autopsy, and found the peritoneal cavity also full of blood.

I relate this as a case in which hemorrhage apparently was prevented for the first two weeks, until possibly the effect of the calcium chloride had worn off. Of course, this is mere conjecture.

I want to say again, before I sit down, that it has been a great pleasure for me to have heard this paper. It has been a source of great encouragement to us all, and a stimulus to do better work.

DR. MAYO (closing).—I have been much interested in that phase of the discussion which brought out the fact that it is possible we may have in the future some stones reformed in the gall-bladder. Of course, Dr. Hall's patient was operated upon about eight years ago, at a time when surgical work done upon this viscus was in an early stage; but in more recent years we are beginning to understand the kind of gall-bladder which should be removed, and it is possible that that element in the course of time will tend (by removing those gall-bladders that are indicated for removal, according to the distinction that I gave) to relieve some cases of possible recurrence of gallstones. We know there have been a great number of gall-bladder operations made, paritcularly in the last few years, which possibly may develop stones in the course of time. I do not know of a similar instance to the one Dr. Hall reported in which the surgeon could not find a stone was left, except possibly one in the cystic duct, because there were over a thousand small stones, I understand, in Dr. Hall's case, with stagnation.

I wish to thank the Fellows for their free discussion of the paper.

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ENTEROSTOMY, WITH REPORT OF CASES.

By J. W. Long, M.D.,
Greensboro, N. C.

By means of an enterostomy, several important measures are accomplished:

1. Drainage of gas and feces from the intestines.
2. In mechanical obstruction, relief of the distention, pain, vomiting, and toxæmia.
3. In septic conditions, depletion of the inflamed bowel and peritoneum. Also the intestinal paralysis and sepsis are overcome.
4. Protection to the peritoneum, as in typhoid perforation.
5. Nourishment to the patient by making an artificial mouth.

As enterostomy is employed only in desperate cases, it is not an exaggeration to say that in any case in which it is indicated the patient is in imminent peril of speedy dissolution from one or many of the conditions indicated in the preceding paragraph.

The Fecal Current Must be Maintained. I have never understood why after an abdominal operation it is so important that the bowels move. But the fact remains that without a bowel movement at an early day, the patient's life is put in great jeopardy. The same is true at all times and in all conditions; drainage of the alimentary canal must not stop.

Enterostomy for Mechanical Obstruction. Mechanical obstruction, whether due to accidental or postoperative causes, offers a familiar picture. The majority of these

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patients die because forsooth nature cannot hold out against the painful peristalsis hurling the fecal current against the point of obstruction, the distention, the projectile vomiting, the exhaustion.

In such cases if the obstruction is removable, and the patient equal to the occasion, do ideal surgery; if not, do an enterostomy.

CASE I. *Acute intestinal obstruction from carcinoma; enterostomy; recovery.*—September 10, 1904, J. R. W., aged twenty-two years, a patient of Dr. C. S. Gilmer, was brought to me at the Greensboro Hospital. He gave a history extending over a year or more of a number of attacks of partial intestinal obstruction; also a history of a movable tumor, the size of an orange, in the left upper quadrant of the abdomen. This tumor would recede under the ribs when the patient laid down. When brought to me there had been no fecal movement for nearly a week, nor expulsion of gas for several days. Projectile vomiting occurred at frequent intervals, and there was sufficient meteorism to prevent palpation of the tumor. The next day I irrigated the stomach, and an hour later opened the abdomen. The tumor constituted the obstruction and proved to be a carcinoma of the splenic flexure of the colon. On the proximal side of the cancer the entire intestines were thickened, inflamed, and distended. The growth was so extensive and the patient's condition so extreme, that it was impracticable to do more than to hastily attach the caput coli to the edges of a short incision over the cecal region and close the median incision. The recovery from the operation was in every way satisfactory.

CASE II. *Strangulated inguinal hernia; bowel gangrenous; enterostomy; recovery.*—Aged about fifty years; citizen of Worthville, N. C.; had had a right inguinal hernia for twenty-five years. In March, 1903, it became strangulated. When seen by myself the local symptoms were typical of long-continued strangulation. The urine was scanty and heavily loaded with albumin, and the patient partially comatose.

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On opening the sac, the contained gut was found to be gangrenous. This, together with the patient's serious condition, precluded the possibility of doing more than to nick the ring, stitch the intestine to the edges of the ring, and incise the gut.

I had no opportunity of doing anything further for this man, since shortly after this time the case passed out of my hands, the wife having taken violent offence because any operation was done, claiming that the man would have gotten well if let alone. As it was, he lived two years.

CASE III. *Stricture of the ileum; peritonitis; enterostomy; death.*—The first time I did an enterostomy was some eighteen years ago in a country cottage, with no skilled assistance. The patient, a young man with a tubular stricture of the lower end of the ileum, was in extremis, with the peritoneal cavity full of bloody serum, and the usual symptoms of acute, advanced intestinal obstruction present. A resection was out of the question, but an enterostomy prolonged his life for four days, much to my surprise and that of his friends. If it had been done forty-eight hours earlier, the ultimate results might have been different.

CASE IV. *Obstruction in colon; appendectomy; enterostomy; recovery.*—August 19, 1903, C. H. B., aged thirty-two years, was brought to me by his physician, Dr. J. H. Moore, of High Point, N. C. The man had symptoms of intestinal obstruction, but before leaving home he had had two or three stools. On examination there was so much tenderness in the right iliac fossa that it was thought best to open the abdomen. The appendix, head of the cæcum, and lower end of the ileum were inflamed.

The distention was so great that a satisfactory examination could not be made. But the inflammation seemed to be centred around the appendix, therefore it was thought best to remove that organ. For the first eight days the patient's convalescence was uninterrupted. After this time tympany began to reappear and obstruction gradually developed again. By August 31st the patient was in a serious condition;

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pulse 160, great distention, no passage of feces or flatus, and vomiting. Ether was given and a median incision quickly made. The ascending colon and the last several feet of the small intestine were greatly distended and inflamed. The obstruction was located in the colon, but because of adhesions could not be brought into view. The anæsthetist warned me that the pulse was 180 and thready. I quickly reopened the wound in the right iliac fossa, through which I brought iodoform gauze against the intestine about the ileocæcal junction. The median incision was closed and every means resorted to to revive the patient. The next day the gauze was removed and the ileum opened. The subsequent history of the case is too long to narrate in full. Briefly, the enterostomy spared his life. For many weeks the patient was sustained by rectal alimentation, with some nourishment given through the fistula. The bowels finally acted naturally and continued to do so while the patient remained in the hospital. Dr. Stewart McGuire saw this man with me and endorsed the management of the case. Later the patient was taken home with the understanding that if his fistula did not close, I would close it. The patient was afterward taken to Dr. H. A. Kelly, who, after repeated attempts to remove the obstruction, finally anastomosed the transverse colon with the sigmoid, thinking this the best solution of the difficulty.

Enterostomy in Acute Peritonitis.—Greenough, in the *Boston Medical and Surgical Journal* of May 19, 1904, discusses the advantages and disadvantages of enterostomy. He points out with great clearness that in diffuse peritonitis the intestinal obstruction is due to several causes, the most important being the paralysis or suspension of peristalsis, which is due to inhibition, distention, and toxins. He might have added that a vicious circle is soon established, since, while the distention contributes to the paralysis, the paralysis certainly favors the distention.

Greenough says, further, that in addition to other operative measures enterostomy is indicated in the graver forms of

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diffuse peritonitis. Its greatest advantage in these cases is the drainage of the bowel of the gases and decomposing contents, which is quickly followed by the relief of the paralysis of the peristalsis. According to Greenough, the mortality of diffuse peritonitis is reduced.

Greg Smith, in his *Abdominal Surgery*, advocates enterostomy, and describes by text and illustration, a method of temporary continuous drainage or syphonage of the intestine by means of a tube introduced through the fistula. I have employed this method with great satisfaction.

The Thirty-first German Surgical Congress considered this subject of sufficient importance to discuss it freely after hearing papers, one by Doyen, of Paris, and the other by Heidenhain, of Worms, both of whom advocated enterostomy in peritonitis for the relief of intestinal obstruction, paralysis, distention, etc.

Heidenhain points out that in these cases the obstruction is often due to pressure on or bending of an overdistended paralyzed loop of intestine, which is relieved spontaneously as soon as the bowel is emptied. The following case illustrates this:

Case V. *Abdominal section; removal of large cysts; intestinal obstruction; enterostomy; recovery.*—In July, 1902, I operated in a negro cabin on M. J. for double intraligamentous cysts of large size. The operation necessitated a good deal of manipulation, and it was fly time. Despite our most vigorous protests, the flies crawled over the sponges, pads, instruments, wound, and would sometimes light on our hands. The result was sufficient peritonitis to cause intestinal obstruction. By the third day it was evident that the patient was rapidly growing worse. No movement of the bowels or escape of flatus had occurred, while the distention was great, the patient was vomiting, the pulse frequent and weak. Without giving an anæsthetic, local or general, I quickly opened the wound and caught up the first distended coil of intestine that presented itself, stitched it to the peritoneum, and after protecting the wound with

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gauze, opened the bowel. A large quantity of gas and feces escaped. Within six hours from that time, the bowels moved *per vias naturales.*

The subsequent history of this case is quickly told. After the sepsis had subsided I attempted to close the fistula by suturing through the wound. The first attempt was a failure, but I tried again and again, gaining a little on the size of the opening each time, until finally, with my stitching and nature's granulations and contractions, the fistula closed.

Unfortunately, in many cases the obstruction is not so quickly overcome.

CASE VI. *Hysterectomy; intestinal obstruction; multiple enterostomy; recovery.*—August 23, 1904, I did a total hysterectomy by the abdominal route on Mrs. P., aged fifty-six years, for carcinoma of the cervix, a patient of Dr. M. E. Street, of Glendon, N. C. Intestinal obstruction intervened with the usual symptoms of distention, vomiting, thready pulse, prostration, embarrassed respiration, and no passage of feces or flatus. On the fourth day the original wound was opened and a distended coil of intestine caught up, fastened, and opened. So little gas and feces escaped and the patient was in such extremis that I was unwilling to depend solely on this opening, fearing that there might be an obstruction above it. Therefore I caught another distended coil and treated it in like manner. This one gave very little better results than the first one, and thinking one might as well be "hung for stealing a sheep as a lamb," I brought up, fastened and opened a third coil of intestine. Deeming this sufficient, the parts were dressed and restoratives applied. The three fistulæ discharged freely. Great care was taken to keep the parts clean, and the bowels were frequently flushed with salt solution. The patient was sustained largely by rectal alimentation, and after a few days by careful feeding in small quantities by the mouth.

By October 12th the patient had so far recovered as to justify an attempt to close the fistulæ, which was done under ether anæsthesia. The abdomen was carefully cleaned, an

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elliptical incision down to the muscle was made around the wound, keeping clear of the infected and by this time cicatricial area. The edges of the island were whipped over together, thereby covering the old wound and fistulæ, into which gauze had been packed. The peritoneum was then opened, taking care to keep far enough away to avoid injuring the adherent intestines. Once the peritoneum was opened, it was easy enough to separate the fistulous area around the greater part of its circumference. There was no peritonitis present, and outside of the coils of intestines containing the three fistulæ there was only one adhesion, and that a thin one attaching a coil of intestine to the adherent coils containing the fistulæ. With extreme care the nearest adherent coil was separated, and the tissues around the fistula trimmed away, and the opening closed. The other two fistulæ were dealt with in the same manner. The third fistula was so large that in cutting away the diseased tissue involved, at least four inches of the length of the gut on its outer rim, and all of its diameter, except the narrow strip to which the mesentery was attached, were sacrificed. This, however, was easily remedied by closing the opening after the method of Jeannel, leaving the diameter of the gut at the juncture larger than elsewhere, which, however, is not a disadvantage. After dealing with the fistulæ, the excision of the fistulous area was completed and the abdomen closed without drainage. The recovery was a good one.

Case VII. *Fulminate appendicitis; operation on the third day; intestinal obstruction; enterostomy; death.*—In October, 1897, J. H., aged about twenty-three years, a locomotive engineer, living at Spencer, N. C., was seized with violent cramps in the abdomen while running his train. He managed to get home and was again taken with most excruciating pains. Dr. W. W. McKenzie and I saw him. The next day Dr. John Whitehead saw the patient with us, but the symptoms had so far abated that he was seemingly nearly well, though no fecal movement had occurred. That night he was for the third time overwhelmed with abdominal pains.

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The next day I opened his abdomen and removed an inflamed septic appendix. The intestines were much distended, peritonitis was widespread, and a considerable amount of free pus was in the abdomen. Four days later, failing to secure satisfactory movements and the tympany becoming distressing, I caught up a distended coil of gut, fastened it to the sides of the wound and opened it. This gave immense relief, and for a while it seemed that the man would recover, but peritonitis and sepsis had gotten in their work and he died eight days after the operation.

ENTEROSTOMY FOR TYPHOID PERFORATION. There is perhaps no indication for doing an enterostomy that deserves more respectful consideration than does typhoid perforation. In an editorial, *American Medicine*, April 4, 1903, calls attention to an article by Escher, Surgeon to the City Hospital of Trieste, Austria, who gives an entirely new indication for enterostomy; namely, perforation in typhoid fever. He reports 4 cases with 3 recoveries. He also cites 10 cases found in the literature, with 40 per cent. of recoveries, which is better than when the ulcer is resected and sutured. Besides, the fistula drains the bowel and prevents paralytic ileus.

Keen read a paper on "The Surgery of Typhoid Fever" before the City Hospital Alumni of St. Louis, June 30, 1904, and said, in discussing perforation, "If the perforation is a small one it should be closed, without trimming the edges, with Lembert sutures. If it is very large your choice must be between a resection with an end-to-end anastomosis and an artificial anus. The artificial anus is so much more safely and quickly done that this should be the operation of choice in most cases. This will of itself diminish largely the future mortality rate."

I have never done an enterostomy for typhoid perforation, but the following case is, in a measure, similar, in that the peritoneum was infected from fecal contamination.

CASE VIII. *Rupture of the small intestine due to fall; general peritonitis; operation on the fourth day; enterostomy; death.*—January 3, 1902, K., aged about fifty years, living

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in Rowan County, N. C., was violently thrown from his mule. Though stunned severely, he was able to mount his mule and ride home, a distance of three-quarters of a mile, without help. Reaching home he sent for his physician, who examined especially the left inguinal region, where the patient had an old reducible hernia. He found there was no descent of the hernia. The third day Dr. A. B. Goodman was called and, recognizing the seriousness of the man's condition, sent for me. I could not reach the patient until the morning of the fourth day. There had been no passage of feces or flatus; there were general abdominal tenderness, rigidity, and slight tympany. Both inguinal canals were clear. On opening the abdomen I found general peritonitis, with fragile adhesions centred about the left internal inguinal ring. Gently separating the adhesions, a ruptured intestine was discovered, the rupture being transverse and about one-third the length of the diameter of the bowel. Nature had made an attempt to adhere this portion of the bowel to the lateral abdominal wall, but infection and widespread inflammation had taken place and the intestines for many feet were too much softened to stand closing the opening or resection. It was thought best to make a short incision in the left inguinal region and attach the torn bowel at that point. The median incision was partially closed and gauze drainage used. The fecal fistula acted well, and for a time the patient bid fair to recover, but the general peritonitis and general sepsis increased, and he died from exhaustion on the eighth day after the operation.

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Remarks. It is quite probable that this man had adhesions about the left internal inguinal ring, and when he was thrown from his mule the sudden tug of the mass of intestines tore the bowel at the point of adhesions.

Enterostomy Fistula May be Used as a Mouth.—In the fifth group of cases, the patient is dying principally from inanition. The stomach and rectum refuse to retain food sufficient to meet the demands. In these cases an enterostomy fistula may be utilized as a mouth.

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Finney, in *American Medicine*, April 22, 1903, p. 305, lays special stress on the practicability of using the fistula as a means of introducing food, medicine, and stimulants. He says: "The intestinal fistula, once established, should be looked upon more as a mouth than as an anus. The amount of food that can be given and retained in twenty-four hours is surprisingly large." He cites a number of cases from his own experience that were saved by utilizing the fistula as a mouth. One of his cases deserves mention, in which the drainage from the fistula was so great that his patient was starving. Finney had a nurse to sit by the patient to catch the fluids as they escaped and to introduce them into the distal portion of the bowel through a funnel and tube.

Greenough also lays special emphasis on the value of feeding through an enterostomy fistula, and says that by enterostomy the surgeon obtains direct control over the intestines for lavage and for introduction of stimulants, nourishment, fluids, and cathartics.

For the same purpose, Napalkow,[1] in *Chirurgia*, January, 1903, strongly advocates enterostomy in certain cases of gastric carcinoma. He excludes, of course, those cases in which gastroenterostomy can be done, but urges enterostomy in all cases where the growth is too extensive to admit of gastroenteric anastomosis. By this means stomach digestion is entirely eliminated, consequently the gastric pains disappear. Napalkow cites his personal experience in favor of this plan, and says feeding can be done quite efficiently by the intestinal fistula alone, while life can be prolonged and rendered tolerable by the operation. In these cases the fistula is, of course, made as near the stomach as practicable.

So far as I am able to recall, I have reported all the cases of enterostomy I have done in twenty-two years of practice, and, singularly enough, 3 of them occurred within the last eighteen months; 8 cases with 5 recoveries from the operation, or 62 per cent., is not a bad showing when we consider the desperate nature of these cases always. As may be

[1] Abstract American Medicine, April 18, 1903, p. 635.

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readily observed, I have not done enterostomy for all the conditions in which it is indicated.

In conclusion it may be said:

1. Enterostomy is always a life-saving measure, never an operation of choice.

2. Enterostomy is not indicated where a more ideal surgical procedure is feasible.

3. In the hands of an experienced, carefully trained abdominal surgeon, capable of dealing with grave emergencies, an enterostomy is rarely resorted to; but the better the surgeon, the more quickly will he adopt any measure that will rescue his patient.

4. Every abdominal surgeon must, according to the abundance of his material, find cases in which only an enterostomy can with propriety be done.

5. When an enterostomy is indicated, to hesitate is to lose your patient; to operate promptly, dexterously, and with celerity means to tide your patient over the imminent peril and spare him for future consideration.

DISCUSSION.

Dr. James A. Goggans, of Alexander City, Ala.—I do not think a paper of this importance should be allowed to pass without some discussion. From my experience I think drainage of the distended intestine is very important. In fact, with the many different abdominal lesions now confronting us, so many of the conditions being accompanied by great distention of the intestine, if we operate and remove a diseased appendage or any other pathological condition, and leave the patient in bed with the bowel greatly distended with fluid and gas, we have done very little or no good, and the patient may die. So I make it a rule, if possible, when I do a laparotomy for any trouble whatsoever, to drain the intestine in order to allow it to regain its elasticity and move the fecal current along as it should go. It is unnecessary for me to relate the number of instances where that was essential in my experience. I have done operations in which I attached very little importance to the pathological condition I had relieved as compared with drainage of the intestine that followed. By simply relieving the obstruction of the intestine and allowing the bowel to regain its elasticity, the patient will recover.

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I wish to commend the author of this paper for the position he has taken in advocating enterostomy and draining when the intestine is greatly distended.

Dr. J. Garland Sherrill, of Louisville, Ky.—I think we ought to utter a word of caution or of protest against this operation, in that enterostomy is not a procedure of choice, as would be inferred from the statements of the essayist. He presented a number of cases of enterostomy. It is true, we will admit, that enterostomy has a place in surgery in those cases where complete surgery cannot be done; but whenever you send a patient away from the operating table with an open intestine, you subject the profession and yourself to criticism from the layman, who does not understand the condition. Therefore, I think we ought to lay down as a rule that no enterostomy should be done in any case where it is possible to do complete surgery, and instead of broadening the field for enterostomy we should tend to contract it. Many cases in which enterostomy has hitherto been done will probably recover as well if the intestine has been flushed out, closed, and the patient put to bed. I feel sure that this will occur in a large number of cases. We must remember also that there is an additional danger added to every patient who goes away with an open bowel. If the opening is high up in the intestine, there is danger of lack of nutrition and death from that source, as well as danger from a secondary operation, and the chances are that the patient will not apply for surgical relief and will eventually die as a result. I think we had better urge caution against the use of this means of relief except in those cases where it is absolutely impossible to do anything else.

Dr. I. S. Stone, of Washington, D. C.—Dr. Long, in his experience, must have gotten hold of a number of very difficult and delayed cases of operation. In coming to this meeting he told me about some of these cases, and I was impressed with the fact that he had quite a number of them, as has been suggested, for one man to have. But Dr. Long covers a vast extent of country, and is called in consultation frequently to see patients who have been sadly neglected. It is, however, no fault of his that some of these patients were in such a bad condition when operated upon. His idea, if I understand him rightly, is simply this, that rather than let the patient die from obstruction, it is better to catch up a loop of bowel and make an artificial anus. That is the old-fashioned way of doing an enterostomy, and by so doing he has obtained results in these cases. We all regret that these cases occur, and it frequently happens that they come in pairs. A man may have two or three of them together, and we can all recollect such instances. So I have sympathy for him in having seen so many, and I must say that I think he has as good a mortality as most of us could have had under the circumstances.

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DR. JAMES A. GOGGANS, of Alexander City, Ala.—I have already made a few remarks on the subject of this paper, but I would like to say a word or two more with regard to drainage of the intestine. In draining the distended intestine, in my previous remarks I did not mean to advocate making an artificial anus in every instance. I can recall cases where I simply drained the intestine after having incised it and emptied it of its contents, closing it by Lembert stitches, returning it to the abdominal cavity, and closing the abdominal incision. I do not believe in making an artificial anus in these cases in every instance, by any means.

DR. LONG (closing).—It would seem that I had unfortunately run afoul of quite a number of cases in which it seemed proper to do enterostomy. I reported 8 cases in my paper, but these were spread over a period of more than twenty-two years of practice. Of these 8 cases, 5, or over 62½ per cent., recovered. I would like to ask any gentleman present if he has had a better percentage in cases of acute intestinal obstruction by any method?

Unfortunately for me, I did not present my views in their entirety before the Association, since in my conclusions I say specifically that enterostomy should never be done when a more ideal procedure can be performed; that enterostomy is indicated only in those desperate cases when nothing better can be done, and in the hands of an experienced, capable, thoroughly trained abdominal surgeon, it is only rarely that one will have to resort to an enterostomy. But certainly, according to the abundance of a man's material, he will now and then come upon a case when there is nothing else to be done, and when he does have a case in which it is indicated, to hesitate is to lose the patient; to operate is to save him from immediate peril and for future consideration.

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THE ABUSE OF PURGATION BEFORE AND AFTER OPERATION.

By I. S. Stone, M.D.,
Washington, D. C.

Synopsis. Hypercatharsis should always be avoided. Its local and general effect. The "flat intestine" rarely necessary. A sterile diet with suitable laxatives sufficient. Perfect rest for the intestines (absence of peristalsis) is desirable. The early administration of purgatives often causes reversed peristalsis. These should not be given until normal peristalsis has been restored. Enemas generally produce sufficient stimulation and in the normal or downward direction. The danger of ileus, paresis, and postoperative adhesions is greatly overestimated.

In abdominal work, surgeons have always been greatly embarrassed by certain complications having their origin in the alimentary canal. Not only have we the immediate results of anæsthesia to consider, and the restoration of the abdominal viscera to their normal functions, but the ever-present and important subject of peritoneal infection and its results. How to avoid extreme nausea and vomiting, all forms of intestinal obstruction and peritoneal adhesions, or to minimize their danger, should be, and probably is, the constant aim of every surgeon. We have for some years had the conviction that the methods generally used in the preparation of patients for abdominal operations were exceedingly drastic and often perilously enervating. In recent years we have modified our treatment, with a view of

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causing less distress both before and after operation, and we are confident that our patients suffer less than before. The chief aim in our preparation of patients is, of course, to enable them to bear the test of operation and to make a safe and speedy recovery. Next, we may, with good reason, add as far as possible what may be to the comfort of the patient during her residence in the hospital, which includes preliminary, operative, and postoperative treatment. In this paper we propose to discuss some of the previously mentioned annoying and dangerous symptoms, and to make suggestions which have as their object some diminution of them. Among the very important considerations in every case in which an abdominal section is proposed is the question, How shall the patient's bowels be prepared? In my opinion the present methods have become stereotyped to some extent, for it is an almost universal rule to produce hypercatharsis. Purgatives have been used like other useful drugs, without rule, rhyme, or reason, save to satisfy the demand that the patient give up everything in the intestines. We fear very little thought has been given to what this costs our weak and exhausted patients, who are already debilitated by infection or protracted illness of any kind.[1]

Excessive purgation causes the discharge of a greater quantity of fluid by the bowel than is given by the mouth. Whence comes this fluid? Does it consist of infectious serum and come from the peritoneal cavity by transudation directly through the intestinal walls? Or does it diminish the amount of fluid in the cavity; and if it does, how do we know such a proposition is based on facts? Again, is it not possible that the fluids thus discharged may have been intended for excretion by way of the kidneys? For, scanty

[1] At a recent meeting of surgeons was noticed the lengthy discussion of the time an operation should require and the quickest way to get the operation completed and the patient back to her room, without a word about the previous condition of the patient or how to conserve her strength and enable her to bear the ordeal of the knife

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urine is always associated with hypercatharsis. Besides, such excessive discharges of serum must produce a relative amount of exhaustion, as the bloodvessels have furnished the greater part of the fluids in question. The idea that every patient subjected to abdominal section should be purged, and drastically purged at that, has held firm sway almost everywhere, and even now we find in our hospitals only two classes of patients so far as the preparation for operation is concerned.

It is either a "major" or a "minor." If a "major," we may expect the patient with only minor surgery, such as a ventrosuspension of the uterus or a conservative operation upon the tubes or ovaries, to have just as vigorous purgation as one in need of resection or who has extensive peritonitis.[1] The belief that if a little purging will do good, more purging should do more good, seems to have been the rule. The exhaustion produced by excessive purgation invariably causes its relative effect upon the circulation, and such treatment will bring the patient to the operating table with a quick pulse of 120, when, previous to the purgation, it was perhaps not over 100. This means incalculable harm to any patient who must remain upon the operating table from one to two hours, or even longer. If there is need for hypercatharsis in any case, and from ten to twenty movements are thought necessary—in resection or anastomosis, for instance—why is it considered the proper thing to practise this outrage upon any one requiring a minor pelvic or abdominal operation? In a vast majority of the adbominal operations as done at the present time, there is no need of the perfectly flat intestine, and no necessity for calomel and saline purgation to produce this result. I am unwilling to make patients suffer such unnecessary discomfort, for I have often heard them declare that the pain and distress after operation was expected, but the "preparation" was far worse than anything else, and that they could never submit to it

[1] In a recent text-book, an emphatic protest was made against this practice. Reed's Gynecology, p. 101

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again. It is time to call a halt in what may be called meddlesome interference with the alimentary canal. It is "interference" in a large number of the minor abdominal cases, and is it also "interference" in very ill patients to purge the greater part of the bowel which is comparatively healthy, in order to reach a very small portion which is diseased, or temporarily incapacitated?

It was perfectly natural that some opposite method should succeed the extreme measures proposed by Clark and others who used the "opium treatment" for all of the varieties of abdominal pain and inflammation. Hence our rule to drain the peritoneal cavity from the inside by drainage tubes, and from the outside by purgation. The pioneers in abdominal surgery taught us to use the short incision, and to rely entirely upon the sense of touch for the separation of adherent surfaces. It was impossible to inspect satisfactorily the entire extent of this work and the resulting injury to the tissues, our chief information being derived from the amount of hemorrhage. The drainage tube was supposed to care for this hemorrhage, and purgation was relied upon to limit the amount of intraperitoneal exudate and fluids of all kinds. In the light of the present advanced position which surgery and pathology have assumed, may we not justly claim that hypercatharsis has no place and no justification when applied to such cases as come to us for abdominal section, if thereby we seek to assist our operation by causing a transudation from the peritoneal cavity to the intestinal canal?

Preliminary Treatment. When the patient is first examined by the house physician he should expose the abdomen in order to ascertain the amount of distention. If distention is marked and depends upon some pelvic or abdominal inflammation due to infection, a different method should be pursued from that applied in an ordinary case of constipation. Here is an opportunity to discriminate between the varieties of distention. Obviously we may detain any patient without serious or dangerous disease until the conditions are perfectly satisfactory before we

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proceed to operation. There is time for the use of appropriate remedies and diet which will bring about a better condition of the alimentary canal than can be obtained by the rapid method of giving calomel and salts and completing the preparation within the twenty-four-hour period previous to operation. The foregoing refers to the duties of the house physician especially, for with trained assistants much valuable time may be saved. It is very important to avoid purgation in thin, flabby-skinned patients. It may be found upon inquiry that such patients have been purged before attention is called to them, and we frequently have purgation withheld in such cases, relying upon enemas given on the morning of operation. It is a common experience to note the presence of large pus tubes or any kind of old suppurative mischief within the pelvis of a woman with a flat abdomen. On the other hand, an immensely distended abdomen is noticed in a neurotic patient who has perhaps very little disease in the pelvis. When we have only a short time (the twenty-four-hour period) in which to prepare patients, we use the method popularized by Ochsner, giving two ounces of castor-oil, followed the next morning by enemas sufficient to empty thoroughly the large bowel. This amount of oil produces an average of four movements, which is quite sufficient for most patients, and will enable the average operator to proceed without difficulty, if he is careful about placing his sponges and is fortunate enough to have a competent anæsthetizer.

Emergency Cases. The question may be asked, "How shall we treat the alimentary canal in acute inflammatory conditions?" In a very large number of our patients, salines or other purgatives have been administered in quantities sufficient to satisfy the most exacting, and we can only give an enema just before operating. On the other hand, if such treatment has not been given, we may find that opium has been administered to enable the patient to bear transportation to the hospital. In such cases we have to choose between the two extremes. Either one of two dangers is to be dreaded:

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great distention (meteorism), or loss of time while waiting for the bowels to act, which often means more peritonitis or infection. In many instances it is better to operate early without catharsis than to wait an indefinite period for an empty bowel which may require sufficient time for greater infection and far more exhaustion. This applies especially to the acute infectious diseases, but there are also other conditions which justify such a course. It is a common experience to witness the loss of valuable time while waiting for the action of cathartics. Hours occasionally pass while waiting, and sepsis and toxæmia often pursue their ravages with great rapidity during this period of delay. I never hesitate to operate promptly in acute appendicitis if opportunity offers within the twenty-four or forty-eight-hour period, without purgation and with only the emptying of the large bowel by efficient enemas, and I have had no complication or difficulty whatever as a result. In the presence of the graver forms of peritoneal infection the rule is practically the same, for it would be the utmost folly to expect purgatives to be retained and to have their usual effect, and we must here decide to act promptly or else adopt the rest treatment of Ochsner.

Postoperative Complications. The complications following cœliotomy have been considered of especial importance, and we believe are regarded with greater apprehension than after any other surgery. The prevailing sentiment nearly approaches a superstition, for we fully realize the uncertainty which has always been known to attend and follow in the wake of any abdominal operation. It is unnecessary at the present time to review the many suggestions made by nearly as many surgeons having in view a diminution of the perils of postoperative abdominal surgery. It is not our purpose to comment at length upon these dangers, but to try and open the door of hope to those who see a possible ileus in nearly every abdominal section, and who are not even comfortable after performing a minor operation. It may be asserted without fear of successful contradiction that a

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great deal of unnecessary anxiety has been felt by many and perhaps most surgeons regarding postoperative ileus, paresis, and peritoneal adhesions. Peritonitis has been called the "fury of abdominal surgery." It would be a fortunate event if we could dispose of the lesser "furies" mentioned.

PARESIS AND ILEUS. It may be taken for granted that nature provided for the period of rest for the abdominal viscera, which we observe to some extent after every cœliotomy. This suspension of peristalsis should be considered most beneficent, and fortunate, and of the greatest value, instead of a danger to be avoided. If viewed in this light it is easy to dispose of the many inventions which have tortured our patients in the shape of purgatives, which have been recommended for the prompt induction of peristalsis. Some of these remedies may be mentioned as curiosities; croton oil, for instance, not to mention the drugs of less drastic nature, which have been practically abandoned.

How to avoid an extreme degree of paresis and meteorism, which occasionally occurs in practice, often when least expected, is a most interesting question. Its prevention is difficult, and perhaps often impossible, but we may do much by causing the minimum amount of interference with the normal conditions found within the peritoneal cavity. Our methods of treatment and prevention should at least not become responsible for the condition we wish to avoid. It has been almost conclusively shown by experiment that peristalsis is readily induced when the bowel contains a certain amount of solid matter (bolus), whose presence favors and assists the action of excitants. It goes without saying, that a perfectly flat bowel will require a longer time after operation before it can recover its muscular tonicity and normal movements; therefore a perfectly empty intestine is not desirable for this reason. There is also room to question the wisdom of excessive purgation for this additional reason, for some cases of experimental ileus are seen in the flat bowel, and we believe the moderately filled intestine is not so easily inverted or so given to any form of obstruction

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as either of the extremes—the absolutely empty or the greatly distended bowel.

Reversed Peristalsis. This condition has caused great difference of opinion among surgeons. Some fail to recognize its presence, and deny its existence as a cause of vomiting after anæsthesia and operation. I believe this condition is frequently the cause of persistent vomiting, and which is generally not favorably influenced by any known drug, unless eserin proves of value. My reason for mentioning this symptom is to condemn the use of any and all purgatives given by the mouth for its relief.

Postoperative Adhesions. Besides the dangers mentioned, the possibility of the formation of peritoneal adhesions must be considered. I fail to understand why a perfectly natural if not a physiological process should be considered a pathological condition. The invariable presence of light adhesions and exudation of lymph which occurs after any interference with the peritoneum, whether in the presence of infection or not, should, and I believe does, indicate an effort at repair, instead of the contrary.

It may be accepted as a fact that it is only when the peritoneum has sustained a severe lesion by trauma or infection that a permanent fixation follows adhesion. That the primary office of adhesive inflammation is a conservative one is no longer questioned, and such belief is borne out in practical experience. Under fairly favorable circumstances, postoperative adhesions disappear, which is certainly fortunate if not so apparent. The same may be said of lymph flakes, which have generally been regarded as foci of infection. I never detach them, and I am content to remove only the large loose pieces which are already separated, and which can no longer be of service.

Treatment After Abdominal Section. As indicated, perfect rest is favored after the abdomen has been opened for intraperitoneal disease. The method which secures the greatest degree of comfort to an inflamed synovial membrane may with reason be applied here. If rest is applicable in one

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instance it may be in the other. First, I wish to direct attention to the vomiting after anæsthesia. If surgeons agree upon any one point, it is that remedies have no favorable effect to stop vomiting. Lavage or stomach washing acts beneficially in this way: its office is mechanical, and rest is the result. We let the stomach severely alone until vomiting ceases, or until the immediate effect of the anæsthetic has ceased, and give no purgative until the normal peristalsis returns. Food is given just as soon as it can be retained by the stomach, and purgatives are not given until after the second day, and possibly not until the fourth or fifth day. On the second day about the time we may expect peristalsis (and we may nearly always observe it by this time) an enema is administered. If necessary, the enemas are repeated daily, and not infrequently the patient recovers without having taken a single dose of any cathartic by the mouth.

As a laxative castor oil holds the first rank. Its use before operation leaves no irritation, and its use after operation will not produce watery stools or weaken the patient. If a sensitive stomach refuses it, any laxative pill or the pulverized glycyrrhiza compound will answer every purpose. We no longer prescribe calomel and salts, and do not expect them or any other purgative to prevent peritonitis if the operation has not had the happy result expected. The perfect reliance placed upon purgation after abdominal operations by many surgeons is a matter of surprise to us. Some are not even content after a resection or an anastomosis until the bowel proves its competency by resisting the force of many and repeated stools. We hope this radical practice may soon cease, for it is rational and safe to permit the wounded intestine to assert itself in its own way and time. Our rule is to induce peristalsis by the use of suitable enemas, and we are satisfied that a downward or normal peristalsis is promoted in this way rather than by the use of any purgative given by the mouth.

VIEWS OF OTHER SURGEONS. Besides the well-known preliminary treatment of Dr. Ochsner, which in the main we

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heartily endorse, two very interesting papers by Dr. Craig, of Boston, have recently appeared, and also one by Dr. Brown, of this city, which are valuable for the information contained therein, and which have, to some extent, fortified my conservative views upon the management of abdominal sections. Dr. Craig has forcibly presented the claims of eserin as a peristaltic stimulant to be used soon after the patient recovers from the anæsthetic for the purpose of inducing prompt intestinal movements in the downward direction. He has been strongly impressed with the necessity for vigorous peristalsis in all cases, and appears to believe ileus, paresis, and adhesions, are to be feared in every instance. He goes even further, and proposes to turn his patients from side to side, and to have them turn themselves as soon as they recover consciousness. He also opposes the use of calomel and saline purgation, either before or after operation.[1]

I heartily endorse the views of Dr. Craig regarding the use of purgation as generally applied, but I must take issue with him as to the necessity for such great anxiety as he appears to feel about peristalsis. Nor do I favor frequent turning of patients for the purpose of preventing adhesions or for any other reason save the important one of giving them rest and comfort by so doing. As to the use of eserin, I have tried it and find that it is at times valuable and we believe it has a future. Our experience with the use of the drug will be duly reported. Finally, we take pleasure in giving to Dr. Brown our renewed thanks for his paper of last year, and while we differ with him about the use of opium after operation, we are sure that the principle asserted will hold good.

CONCLUSIONS. Excessive purgation should be restricted because it is enervating to the general system. It produces great irritation to the mucous lining of the bowel. It may add to some of the dangers we are most anxious to avoid—

[1] Am. Jour. Obstet., April and September, 1904, and TRANS. SOUTHERN SURG. AND GYN. ASSO., 1903.

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ileus and paresis. Purgatives have very little effect in limiting the amount of extraperitoneal exudate and fluids. Instead of calomel and saline purgation, bland evacuants such as castor oil should be used before abdominal section. The use of suitable bland non-fermentative foods is desirable until just before operation in weak patients. After operation, limit peristalsis; give only small quantities of food and drink by mouth. Rarely give opium. Enemas should be administered to relieve distention and cause peristalsis in downward direction; after normal peristalsis laxatives should be given as required.

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A REVIEW OF THE TREATMENT IMMEDIATELY BEFORE AND AFTER ABDOMINAL SECTION.

By Lewis S. McMurtry, M.D.,
Louisville, Ky.

The directness and simplicity of surgical methods are proportionate to the accuracy of pathological knowledge. Consequently with the perfection of knowledge in the continuous study of pathological conditions, and especially as advanced by clinical observation and experience, surgical treatment is revised by the elimination of all unessential details.

This observation is pertinent to the marked changes which have characterized the evolution of the modern aseptic operative technique. The present methods, as generally practised by leading American surgeons, are wonderfully simplified as compared with those of that early period of the aseptic era when chemical germicides played such a conspicuous role in every phase of the scheme of operation. It is the purpose of this paper to briefly review the methods applicable to the preparation and after-treatment in abdominal operations, and to direct attention to certain changes which are the result of recent bacteriological research and accumulated clinical experience.

We will presume in this paper that the diagnosis has been sufficiently established; that the operation has been definitely planned by the surgeon and accepted by the patient; that a searching examination of the general system has excluded all serious complications and contraindications to operation,

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and that the operation is one of election. What period of time should be allotted to the preparation of the patient; and in what should such preparatory treatment consist?

All will concede that I am omitting cardinal and essential points in this restriction of my thesis. The patient's personal and family history; the condition of nutrition and blood state as indicated by weight and blood count; chemical and microscopic examination of the urine; examination of the heart and lungs by auscultation and percussion, together with repeated local examination of the diseased area, should compose the first consideration in the preparation of every patient submitted to abdominal section. While such preparatory investigation may, as a rule, prove negative, I doubt if there is a surgeon here that has not known disaster justly attributable to the disregard of this essential precaution. It is needless to add that preparatory investigation should be done thoroughly and carefully, with capability and judgment, and its results given due and proper consideration. While it increases labor, and, as already stated, is only exceptionally contraindicative, its essential importance is attested by these exceptional cases. The relation of anæmia to surgical intervention should receive judicious consideration. If the anæmia is the result of hemorrhage which is persistent and which the operation will arrest, it is an indication for immediate operation; if the anæmia is due to extraneous causes, a judicious delay under appropriate treatment may be most advantageous. The same may in general be said of associated functional and organic disease of other organs; if these disturbances are the result of the disease for which the operation is proposed, no advantage can, of course, be expected from delay and treatment of such associated conditions. When, however, the patient is the subject of disease quite distinct from that for which the operation is contemplated, and which may be improved by treatment, or in which an acute diffuse infection exists which may become circumscribed, delay and treatment are indicated.

The general indications for preparatory treatment, as

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commonly observed, are to cleanse the alimentary canal thoroughly without violent disturbance and exhaustion; to put all the eliminative functions in the best condition possible, and to favor in every way a tranquil state of mind and body. For years it has been taught and practised by eminent surgeons that whenever practicable the patient should be put to bed and given preparatory treatment for at least three days and preferably longer. Some time ago I became satisfied that this is not the best course, and altered my practice accordingly. Inquiry among my friends who do abdominal surgery revealed that others have revised their practice in this particular, while many others insist upon a prolonged period of preparatory treatment.

If the patient comes into the hospital twenty-four hours prior to operation, the alimentary canal can be thoroughly cleansed by a reliable and unirritating cathartic. My preference is for castor-oil, which may be disguised in taste so as not to offend the stomach. The fluid extract of cascara sagrada in aromatic elixir is an excellent agent for this purpose. It may be followed in six hours by a saline cathartic, and a laxative enema will, if required, assure the action of these remedies. The reduction of the patient's diet to a minimum, giving the smallest quantity of bland fluid food, will complete this part of the preparatory treatment. It would be better for the patient to have no food whatever, as a rule, during the twenty-four hours prior to operation. An abundance of water, preferably hot, should be given. There is an advantage in having the bowels cleansed out in a relatively short time; the patient is not relaxed by purgation and is less prone to suffer from the products of toxic changes. Prolonged and irritating catharsis increases the nausea and vomiting of ether and chloroform anæsthesia.

Before the antiseptic era, the greatest peril in abdominal operations was sepsis; and the leading ovariotomists practised the opium treatment both for prevention and cure. With the advent of modern abdominal surgery, under the leadership of Mr. Lawson Tait, this practice was discarded and

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purgation was applied both in preparation for operation and the prevention and treatment of peritonitis. Mr. Tait's conception of the therapeutic process was similar to that so effectively applied for relieving an auto-intoxication of intestinal origin. He claimed that the lymphatics of the entire peritoneum were drained by active catharsis, and that toxic material in the peritoneum, capable of local and systemic infection, was quickly eliminated thereby. It was the reaction to another extreme from the error which misapplied the opium treatment for accomplishing the desired therapeutic result. As usual, both extremes were wide of the mark, and clinical experience has demonstrated the error of excessive purgation which succeeded to the error of the opium treatment.

For the purpose of this discussion, cathartics may be said to have two modes of action: by stimulating peristalsis and by rapidly increasing the quantity of fluids in the intestines. The excess of fluid is furnished by transudation from the vessels of the intestinal mucosa, and it has never been proven by experiment or otherwise that the products of infection within the peritoneum can be removed by this process, so as to prevent the entrance of these products into the general circulation. Certainly to stimulate peristalsis facilitates the diffusion of infecting material by overcoming adhesions and increasing the extent of contact of infected with uninfected surfaces of peritoneum. For these reasons any resort to cathartics to prevent infection, before or after abdominal operation, is an error. To cleanse the intestinal tract prior to operation adds to the patient's comfort by relieving the bowels of irritation and distention, and facilitates operative procedures. This can be accomplished by an unirritating cathartic, aided by laxative enemata if required. Hypercatharsis weakens the patient, exhausts the peristaltic function of the intestines, and, by draining the intestinal circulation, aggravates post-operative thirst and facilitates the absorption of septic material. The practice of excessive and continued purgation preparatory

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and subsequent to abdominal operations should be abandoned.

The general warm bath so universally given as a part of preparatory treatment is of positive value.

In so far as general systemic treatment is concerned, this is all that is necessary in the great majority of cases. The bowels have been cleared of accumulated material; the vascular system has been relieved of any accumulated excess; the skin and kidneys have their functional activity facilitated. The patient's strength has not been impaired, and the nervous system is not depressed by prolonged contemplation and dread of operation. The depressing effect of prolonged confinement to bed preparatory to operation is most marked in elderly patients.

The next consideration in connection with the preparatory treatment relates to the cleansing of the skin over the surface known as the field of operation. At the outset we must accept as an established fact that sterilization of the skin from a bacteriological standpoint is impossible. Yet mechanical cleansing will for all practical purposes render the skin free from infectious germs. In the effort to accomplish this immunity the important fact has been overlooked that the unbroken skin is possessed of a resistance to such germs, and that when smooth and intact the bacteria are most readily dislodged. Excessive scrubbing with a hand brush, thus breaking through the epidermis, and the application of irritating chemical germicides, which produces fissures and rough surfaces, should be sedulously avoided.

Professor Benike, formerly of Sprangel's clinic, now at the University of Tokio in Japan, has published a series of experiments that are most instructive in this connection. Placing a perfectly smooth rubber glove upon the hand, and placing the fingers in pus, he found by examination that all germs were readily removed by washing for a short time in running water. But if the fingers of the glove were roughened or grooved so as to afford crevices and rough surfaces, cultures were active after repeated and persistent

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washing. Since discarding the brush and mercurial solutions in the preparation of the field of operation there has been marked decrease in the number of stitch infections. The essential point in skin cleansing is thorough washing with soap and water. If this is done thoroughly and with care, all the other means of disinfection may safely be discarded. The method I have followed for the past year is to give the skin of the abdomen a thorough washing on the afternoon before the morning of operation. The skin is washed thoroughly with soft soap and warm water, using a gauze pad in rubbing. Then the skin is shaved, being careful not to do injury with the razor. The surface is then washed with warm sterilized water and aseptic gauze. After drying with aseptic gauze, a compress of the same material is applied, secured by a bandage, and allowed to remain until the patient comes on the operating table. When the patient is anæsthetized and placed on the operating table the bandage and compress are removed, and the field of operation is given a final cleansing with the tincture of green soap and warm water, applied with aseptic gauze; this is washed off with warm sterilized water, and then commercial alcohol is applied and the cutaneous surface finally wiped off with sterilized water. The important points are to thoroughly cleanse the skin and preserve the cutaneous surface smooth and intact, discarding the brush and chemical germicides for this purpose. The field is covered with a fold of aseptic gauze saturated with sterilized water while the sterilized towels are being placed around, and this is removed when the operator is ready to make the initial incision.

The scope of this paper will not permit a detailed consideration of the variations from this simple course of preparatory treatment which may be necessitated by complications and special conditions. It is my endeavor alone to give the essential principles as applied in daily practice, leaving to the surgeon's judgment the modifications necessary in particular cases under special environment.

The nausea and vomiting which follow immediately upon

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surgical anæsthesia demand first consideration in the after-treatment of abdominal operations. The personal equation is of conspicuous importance in this connection, since some individuals tolerate ether and chloroform with less gastric irritation and systemic depression than others. Moreover, the production of the required degree of anæsthesia with a minimum amount of ether (or chloroform), which depends upon the skill and training of the anæsthetizer, has much to do with minimizing subsequent nausea and vomiting.

In the great majority of cases, no other treatment will be required beyond absolute rest of the stomach. Internal medication is without avail to mitigate nausea or arrest vomiting, and the patient will do best if kept quiet and given the customary attention of the nurse. This latter includes bathing the face with cold water, if acceptable to the patient, and other simple means of promoting comfort. In most instances absolute quiet, with head low and eyes closed, with all possible self-restraint on the part of the patient, will do more in the way of relief than any treatment. When vomiting is excessive, I know no remedy comparable with lavage of the stomach. Should nausea and vomiting persist despite this treatment, all food should be withheld and the patient maintained by nutrient enemata. Under such enforced rest the stomach will most readily resume its function. The first food given by the mouth under these circumstances should be very light and in small quantity.

Pain after abdominal operations is most variable. Nervous women, and especially those who have long resorted to opiates and other anodynes, give way to pain and lose self-control for hours and even days. The pain is usually referred to the lower abdomen. The pain is in no way proportionate to the character and extent of the operation. It is common observation that severe pain will follow a simple operation, and oftentimes very little pain will obtain after prolonged operations involving extensive intra-abdominal dissection and separation of adhesions.

There is no contraindication to the use of appropriate

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remedies for the relief of pain after abdominal operation. While anodynes should not be given as a routine measure, tending as they do to prolong nausea and beget tympanites by delaying the resumption of peristalsis, such objections are not sufficient to proscribe their exhibition when required. Small doses of morphine hypodermically administered will mitigate pain and quiet the patient during the trying hours following operation without appreciably retarding convalescence. Heroin in doses of one-twelfth or one-fifteenth of a grain hypodermically will take the sharp edge off the pain and mitigate suffering to a degree that is endurable, and without appreciable interference with convalescence.

To relieve the thirst after abdominal operations remains an urgent problem. Despite the suggestion of Clark to give the patient saline solution by rectum (on the table) immediately after operation, in order to supply fluid to the system as a preventive of postoperative thirst, this symptom remains one of the most distressing which the patient encounters during the first twenty-four hours. It is my practice to test the retentive power of the stomach *early* by giving either hot or cold water, and increasing the quantity as it is tolerated by the stomach. Even if rejected by the stomach, the early ingestion of water does no harm.

The practice of requiring the patient to remain in the supine position for the first twenty-four hours after operation is not of any special value. Comfort is promoted by change of position, and such change should be permitted. In this connection we may also observe that bulky abdominal dressings are often oppressive and uncomfortable. They are quite unnecessary. Indeed, when the incision is properly dressed with gauze, retained by adhesive plaster, even the binder may be omitted without any disadvantage whatever.

The observations already made in this paper upon the abuse of purgatives preparatory to operation may likewise be applied to purgation as a routine part of the after-treatment of abdominal operations. In the early days we undoubtedly overestimated the importance of moving the

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bowels on the third day as an essential to advancing convalescence. This practice is yet altogether too common. If the patient is doing well there is no more reason for moving the bowels quickly and urgently after abdominal section than after any other important surgical operation. During a varying period immediately after abdominal section there is impairment of peristalsis, which is duly resumed in uncomplicated cases. It is better to wait upon nature for such restoration of function than to invoke it by drastic cathartics. In uncomplicated cases a laxative enema given with the aid of the tube during the latter half of the second day will relieve the bowel of gas and contribute to the patient's comfort. A repetition of this high enema on the third day will almost invariably be followed with an effective bowel movement. In this way the function of the bowels may be facilitated without disturbing the entire alimentary canal with an active cathartic.

It has been my purpose in this paper to merely review the salient features of the treatment preparatory and subsequent to abdominal operations as applied daily in the average run of cases. The limitations, necessarily imposed, exclude from consideration the important subject of shock, and the manifold conditions which are presented by special and complicated cases.

DISCUSSION ON PAPERS OF DRS. STONE AND McMURTRY.

DR. HERMAN J. BOLDT, of New York City.—I have listened to the reading of these papers with very great interest, and I consider both exceedingly timely. It is my opinion that too much preparatory treatment has been used in our abdominal work.

Regarding the first paper, concerning the abuse of cathartics before and after operation, I think perhaps more harm has been done by overmedicating patients with cathartics prior to operation than would have been done if no medication had been used for that purpose. Neither do I consider it desirable to commence crowding patients with cathartics within twenty-four hours following an abdominal operation, as is so frequently the case among operators. I believe that the view which has been taken

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by Dr. Stone, of letting the alimentary canal alone except the large bowel before operation, keeping it empty, is the correct one, and we should wait for two or three days before a cathartic need be given. I have for a couple of years resorted to giving a cathartic shortly before operation in very many instances, which has proved very efficacious, namely, to give a cathartic, whichever one desires to use, perhaps half an hour before operation, and as a rule we would have the effect that is so desired within twenty-four hours, and that cathartic which has given more satisfaction than any other is a preparation called Exodin, which seems to have a better effect in this way: It does not cause griping; it causes a normal fecal evacuation in from twenty to twenty-four hours after its administration. Then we have the effect following the operation.

So far as the other preparation of the patient is concerned I coincide with every word Dr. McMurtry has said. I do not know of anything which is more to be deprecated than to scrub the abdomen of the patient with a stiff brush until you get off the epithelium.

Regarding further treatment, Dr. Ries, of Chicago, some years ago, before a meeting of the Chicago Medical Society, read a paper in which he advocated letting patients out of bed early and allowing them to do whatever they pleased practically after operation, provided there were no contraindications. A few months ago I corresponded with Dr. Ries, and he informed me that I was perfectly right in my understanding that he allowed his patients to get up after an operation, often earlier than the third day. He permitted them to get up as early as the first day in some cases.

After doing an abdominal operation, provided the wound has been closed in tiers, unless there are reasons why we should hurry the closure of the abdominal wound, I permit the patient to move about as much as she likes immediately following the operation, and I allow such patients to get out on the second, third and fourth days, and have them leave the hospital not infreqeuntly at the end of a week, and I have found that they do very much better. Furthermore, I do not restrict the diet in any way, and as soon as the stomach is able to retain food, I allow them a full and liberal diet. I have practised that plan of after-treatment in fully fifty cases, and have not yet found a case in which I had reason to regret it.

Dr. W. P. Carr, of Washington, D. C.—I was very glad to hear the paper of Dr. Stone. I expected to hear considerable criticism of it, but so far there has been little or none. I have had occasion to operate on many abdominal cases where there was no chance for previous preparation. Patients brought into the Emergency Hospital with wounds of the intestine or rupture of the intestine, have been operated upon without waiting for any

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purgation or even emptying the stomach. We have operated on them at once, and I think a good many of them have been saved by prompt operation that would not have been saved if we had waited for the stomach to get emptied. They would have died, if we had waited for purgatives to act. It has been my experience that these patients have not only stood operation as well as those prepared beforehand, but they have done better. This is possibly due to the fact that they were usually vigorous persons, in good health at the time of the injury. But I believe, as a rule, persons in vigorous health do not stand abdominal operations better than those who have been suffering from abdominal disease for some little time. I think it is probably due to the fact that these patients were not subjected to debilitating treatment in the way of purgatives.

I have never used hypercatharsis, but have confined myself to simple purgatives, using a calomel, and salts, and I do not think it is necessary to have the bowel absolutely emptied, nor is it even desirable to have it so. I think Ochsner has shown very plainly that the peristaltic movements of the bowel are due more to having some irritating substance in the stomach than in the bowel itself; that the wave of peristalsis usually starts in the stomach and passes on down through the bowel, and in that way, if the stomach can be washed out, and it can be done on the table at the time of the operation, either before or after it, we will stop the peristaltic movements and arrest the consequent spreading of infection. Purgatives given just after an operation would tend to increase peristalsis and do exactly what we do not want to have done. My idea is that we want the bowel to be at rest after an operation for at least twenty-four hours; or until the nausea and vomiting have ceased. Purgatives given before that time increase pain and vomiting. Washing out the stomach after every operation I have practised for some time with great relief of nausea as well as of pain, and I have tried Ochsner's treatment in some cases of severe appendictis where there was great pain. Washing out the stomach and keeping the patient quiet have relieved the pain, as he says it will. As pain is produced largely by peristalsis, if we apply this rule in operative cases, we will find that our patients have less pain and much less vomiting. Not only that, but I believe we will have less inflammation, less adhesions, and really less danger of obstruction of the bowel following. If we are going to have any serious obstruction of the bowel following operation, it is not going to be due to the quietude of the bowel, but to some inflammation of the bowel which will cause adhesion. That inflammation will be less if we do not use purgatives.

Dr. Charles H. Mayo, of Rochester, Minn.—I have been very much interested in these two papers of Drs. Stone and McMurtry. They are in the right direction, for the reason that

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both urge simplicity of preparation and simplicity of treatment. There is hardly an operation in surgery to-day that would be recognized by its originator. It has become so simple. The glamor of surgery has been cut away, and in its place we have only the necessary detail to be carried out. That is true in antisepsis; it .s true in the preparation of cases, and all through our whole surgical work there have come simple methods of taking care of the patient beforehand, preparing him thoroughly for operation, and omitting no essential detail, even in the operation itself.

I presume that this year in our hospital we will have had fifteen hundred abdominal sections, and I will say that 90 per cent. of those patients will have entered the hospital on the day preceding the operation. While these patients may have been in town and under observation for a day or two, I can say that there has been no special preparation unless it was absolutely indicated. All chronic cases are given some cathartic, usually castor oil. They get a bath, and the next morning they are thoroughly shaved and prepared about an hour before the operation. Sometimes, in a few cases, patients are prepared on the table, so far as shaving goes, the same as we used to do in any of the ordinary cases of strangulated hernia, and it was so rare in such cases to have any suppuration, even when done in a log cabin; if you had a case of strangulated hernia the wound would always heal without suppuration. A few years ago we had suppuration when the preparation was incomplete; we had a few cases of stitch abscesses. We redoubled our preparation, and the more work we did in preparation, the more we broke down the natural resistance of the skin to the germs which have their natural habitation in the skin. There is no known method by which they can be removed; therefore, they should not be irritated.

In all the work that has been done in advocating simplicity, I have been very glad to have heard the authors of these papers urge it still further.

Dr Charles L. Bonifield, of Cincinnati, Ohio.—I heartily agree with everything that Dr. Stone and Dr. McMurtry have said in regard to the preparation of patients for operation. It has been my rule for five years to have the majority of my cases for abdominal section enter the hospital not more than twenty four hours before operation. It has been my rule during that time not to purge them with calomel or salts before operation. There is good reason for this. By purging with these agents, the amount of circulating fluids in the body is reduced and the patient is made less able to stand the shock of operation.

I regard it as exceedingly important that the intestines be comparatively empty. I have never yet had sufficient nerve to ask the majority of my patients to take castor oil, although I believe there is nothing better than it. To very many of them it is

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nauseating, and so it has been my rule to give some other simple purgative, and my preference has been the compound extract of colocynth. It is efficient, but not drastic. Belladonna or hyoscyamus should be added to it to prevent griping.

As to the after-treatment of abdominal sections, I cannot agree with everything that has been said. I do not believe in hypercatharsis. On the other hand, I feel more comfortable about a patient after her bowels have moved. It has been my observation, embracing a tolerably large experience under Dr. Reamy, and in my own work, that a patient feels better after the bowels have been moved, and occasionally a life is saved by early, free purgation.

One of the speakers mentioned the fact that washing out the stomach relieves pain considerably. It does not relieve it so efficiently as does getting the bowel emptied. What is the cause of a great deal of pain after abdominal section? It is distention of the intestines themselves; traction on the mesentery. We all know that the intestine is not markedly sensitive; we can get it outside of the body for an enterostomy, we can cut it without an anæsthetic, and the patient will scarcely flinch. It is not sensitive. It is, therefore, distention of the bowel and the consequent traction on the mesentery which gives rise to pain. It naturally follows that the best way to relieve the pain is by relieving the distention, *i. e.*, by purgation. If purgation gives our patient comfort, if we can resort to it without special harm, why not do it?

It has been said that free saline purgation drains the peritoneal cavity through the bowels. There is undoubtedly some truth in this statement, and it was this action of purgation that made it so popular some years ago. The necessity for draining the peritoneal cavity, in this or any other way, does not occur with the same frequency now that it did then. In those days incomplete work was done through small incisions. Now, an incision of sufficient length to enable the operator to see what he is doing is made. Great care is taken to protect the peritoneum from all unnecessary injury, and to repair any injury that is done The normal peritoneum can take care of considerable fluid and some infection. The damaged peritoneum cannot.

With the careful technique of the present day, it is not often that drainage by saline purgation is required, but it is still valuable when it is needed.

Dr. Craig will tell you something about a drug that is not a purgative; it is used by horse doctors all over the country; it was used by them before we used it. It acts simply by causing contraction of the muscular coat of the intestine, and I believe that drug is of very considerable value.

I advised the use of this drug in a paper read before the Section of Obstetrics and Disease of Women of the American Medical Association, at its Columbus meeting, June 1899,

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As a rule, I do not give a purgative until the nausea from the anæsthetic has ceased, and if the nausea does not cease in a reasonable time the stomach is washed out. After that I give my patients calomel because they take it easily. It is not easily rejected. I find that the compound extract of colocynth can be readily given in capsule form and ordinarily does not nauseate, and is a good thing with which to follow the colomel. After peristalsis has been started by these drugs an enema of soap and water is given. In this way I usually secure a good movement of the bowels within thirty hours after operation. If saline purgative is indicated it can now be resorted to. But it is my experience that salines given before the bowels have been moved by other agents is apt to cause nausea and vomiting. Hypercatharsis is never caused by the judicious use of the drugs I have recommended.

A case I saw in consultation just before I came here throws a little light on the value of purgation, I think, but not after abdominal section.

A man was working in a factory when a heavy weight fell on his abdomen. The physician in attendance recognized a pretty severe injury, and thought there might be either perforation of the bowel, a ruptured kidney, or something of that sort, and wisely put the man on a light diet and made no effort to purge him. After a day or two he tried to empty the bowels by enemata, but they were unsuccessful. I saw the case at the end of this period, advised small doses of calomel, followed by salts, and in twenty-four hours the patient was practically well. The night before the attending physician gave a hypodermic of morphine to relieve pain. Pain with distention was relieved. That is what follows frequently mild purgation after abdominal section.

DR. DANIEL H. CRAIG, of Boston, Mass.—After the partial introduction that Dr. Bonifield has given me I feel that I am justified in saying a few words. First, however, I desire to thank Dr. Stone and the other members of this Association for the privilege of being here. I think the distance I have come attests my appreciation.

To come to the question of postoperative intestinal paresis: let us consider the question of the overestimation of the importance of intestinal paresis, as brought up by Dr. Stone. Later in his paper he also said something about expecting adynamic ileus after nearly every operation. Such views, I agree with him, unquestionably constitute a well-nigh unjustifiable overestimation of the frequency of adynamic ileus at least, in any serious degree, but serious adynamic ileus does occasionally occur, and when it does occur it is the one thing which shows the surgeon's impotence as nothing else can. Therefore, if we can find a means which will, without in the least jeopardizing the patient's life, and without complicating either preparation or convalescence,

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remove this danger of adynamic ileus in that occasional case in which it would otherwise occur, it would seem as though we were justified in employing such means.

In the preparation of patients for laparotomy we should aim at rational catharsis only, and the dose of any cathartic and the number of movements will vary according to the condition of each patient. We are led to believe that copræmia and its resultant fermentative toxæmia exert a harmful influence upon the patient's well-being, and it seems appropriate when we have time that we should so far empty her bowel, at least, as to relieve her of that complication.

Dr. Stone is, however, undeniably correct when he states that peristaltic action is more promptly restored in a bowel which has not been completely emptied, which fact is easily explained physiologically. Bayliss and Starling have demonstrated conclusively that the best of all peristaltic stimuli is a bolus within the intestinal lumen. Therefore, when through incomplete emptying of the intestine such a bolus is left, it acts as a stimulant to intestinal peristalsis.

Adynamic ileus, as I have studied it, is to a certain extent analogous to infection and resistance; the reflex inhibition representing infection, and the intrinsic stimulation representing "resistance." The reflex inhibition is produced through the irritation, mechanical and chemical, of the intestine itself, which engenders centripetal nerve impulses conveyed to the spinal reflex centres, which in turn engender centrifugal inhibitory impulses; the latter are conveyed to the intestine over the fibres of the splanchnics. To combat this inhibition we have the activity of the intrinsic ganglia of Auerbach's and Meissner's plexuses, which by their action alone are capable of rendering the bowel absolutely autonomous when freed absolutely from all central nervous connection, producing by their stimulation a purposive, correlated set of movements comprising a contraction above and a dilatation below any bolus which must result in its forward propulsion.

Dastre and Morat have shown that the most potential means of inhibiting intestinal peristalsis is by irritation of the outside of the intestine itself, the slightest handling establishing the above-cited splanchnic inhibition. The vagi have comparatively little influence upon peristalsis, since they control largely the vasomotor condition of the bowel.

We have, therefore, two factors acting against each other; the intrinsic intestinal ganglia in the plexuses of Auerbach and Meissner working to keep up muscular activity, and the splanchnic inhibition trying to stop such activity. Whether or not a serious intestinal paresis follows our operation depends then upon which factor is the stronger. In the vast majority of cases, after a temporary contention, Auerbach's and Meissner's plexuses do

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their full duty, overcome the inhibition, and we get no serious paresis.

The means of equalizing these forces I have found in eserine, to which Dr. Bonifield has referred. Eserine accomplishes this result as follows: Eserine is carried through the circulation to the intestine, where it comes powerfully to the assistance of Auerbach's and Meissner's plexuses by a direct stimulation either of the muscle fibres themselves or the delicate nerve terminations within them. But fortunately this, which would probably alone be sufficient, is not its only action. Belonging as it does to the same group of spinal depressants with pilocarpine, it lessens or stops the reflex inhibition being carried to the bowel over the splanchnics. Therefore, by the use of eserine we greatly increase the ability of Auerbach's and Meissner's plexuses to maintain peristalsis, while we at the same time greatly lessen their difficulty through spinal opposition.

In my first studies in the use of eserine I came very near going to pieces on the rock which wrecked Pankow, as shown by his article in the *Zentralblatt für Gynäkologie*, in which he reported unfavorably on the action of eserine in this connection. He used altogether too small doses and used an unreliable preparation, and I too, at one time, used the same doses and very nearly abandoned the entire work as worthless.

Dr. Stone spoke of a period of "physiological rest" as being desirable after the opening of the abdominal cavity. I do not think he meant just that, because we have no proof that the Lord ever provided in our physiological *régime* for the opening of our abdominal cavities as a part of our normal existence. It would seem, therefore, if the abdomen is opened that its results and sequelæ would be pathological, or at least perverted physiology, rather than physiological.

Lastly, there can be no question that eserine contributes to the comfort of the patient. The bowels do not become distended after its use. I no longer insist upon having the bowels move within twelve to forty-eight hours after operation. It makes no difference, if they are soft and undistended and there are no symptoms of copræmia, if they do not move until after the patient is taking solid food, usually on the fourth or fifth day. It is simply a question of maintaining her bowels in a soft, comfortable condition approximating as closely as possible their normal.

DR. HORSLEY.—I would like to ask Dr. Craig how he administers eserine?

DR. CRAIG.—I do not consider it justifiable to give eserine before operation; but with a properly selected preparation and dose, I have found it universally active. I have had considerable correspondence with persons who say they have found eserine unreliable, its action variable. I have found that there was either some trouble as to the way they were using it, or with the prepara-

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tion they were using. My method of administering it is this: If a preliminary exploration of the abdominal cavity has demonstrated the strong probability that I can close the abdomen without doing injury to the muscular coats of the bowel, and there is no necessity for temporary absolute rest to those muscular coats, I administer a dose varying from one-thirtieth to one-sixtieth of a grain hypodermically on the operating table, while the patient is under ether, and the sooner the better, as soon as I can determine the correctness of giving the smallest dose which will keep that bowel in a healthy condition—in other words, the smallest dose which will sufficiently shut off splanchnic control and reinforce Auerbach's and Meissner's plexuses. At first, I gave decidedly larger doses than were necessary. I found by later experience that such doses resulted almost invariably in a loud, borborygmus, and oftentimes in movements of the bowel. I find it is perfectly feasible to judge, usually by the previous history of the patient, as to her response to the various cathartics that are ordinarily used, as to the required dose of eserine, and one can so modify the dose in the vast majority of cases as to get comfort or relief from a distended abdomen, without any audible peristalsis, and many times without any movement of the bowel for two or three days after the operation. On the other hand, if I have a patient in whom I have reason to believe the intestine partially filled with a mass of material, which may ferment, may give rise to toxæmia, I give a little larger dose of eserine, and it has been my experience to have the bowel promptly and easily relieved of that accumulation within anywhere from twenty-four, thirty-six, or forty-eight hours after the patient has returned to her bed, and the intestines assuming a quiescent state, so far as purgation is concerned, for two or three days. I have never had occasion to repeat the dose, but simply give one dose on the operating table.

Dr. Roberts.—I would like to ask the Doctor whether he has had occasion to give eserin after distention of the abdomen?

Dr. Craig.—Yes. Very successfully.

Dr. Roberts.—I have had a good deal of experience with this agent myself, and have had the same results as those mentioned by Dr. Craig, in this class of cases. I have, however, repeated the dose several times in some instances.

Dr. E. Denegre Martin, of New Orleans, La.—I wish to call attention to one or two points that have been brought out in the papers and in the discussion, first with regard to preparation. I am delighted to see so many to-day using simpler methods. I formerly scrubbed the abdomen of patients so vigorously as to almost create a dermatitis, and invariably there were stitch abscesses following. I do not think the scrubbing was the only cause of these abscesses. In a great many instances, they were due to tying the sutures too tightly and causing necrosis in that way.

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In the past year or more I have modified my practice in that regard. I approximate the edges, tying the sutures loosely, and in a short time œdema of the parts will cause perfect coaptation of the edges. When the œdema subsides, union is perfect and the sutures are so loose that they can be cut without difficulty.

As to purgation, my method is to give castor oil in these cases, as I believe it is the best thing we can use. I can testify to its value, I have taken it myself. If given in a glass of beer, the patients would hardly know they have taken it, unless told so, or find it out by the subsequent result. I give it to them about twenty-four to thirty-six hours before operation, followed by an enema about three hours before. With this I have had the best results, and less nausea following operation from chloroform, which we use almost exclusively in New Orleans. In preparing the abdomen, I rely upon the razor more than the brush. I do not think there is anything better with which to remove any infection about the abdomen or body than a razor, preceding it with the use of soap and water, and wiping the surface with gauze.

In the preparation of the hands, I cannot help but believe that we use the nail brush too freely, and not infrequently we see surgeons with a dermatitis, cracked fingers, due to the fact that they have overwashed their hands by using some antiseptic which is altogether unnecessary. I was particularly impressed by this during my visit to Dr. Mayo, a year or so ago. There they do not use the brush at all except for the nails, and I have since advocated their method. It is almost impossible to disinfect the hands thoroughly if in a roughened condition, and I believe this is sometimes a source of infection.

DR. STONE (closing on his part).—Some years ago a lesson was taught me in regard to intestinal obstruction, when I happened to see Bantock perform his eighty-sixth consecutive ovariotomy, without a death. There was bowel obstruction following the operation in this case, and the case went on for three weeks, while I was there, without any marked distention, because Bantock did not give purgatives. That lesson was an important one to me. Since then I have been an easy victim of those gentlemen who have suggested that we have been overdosing our patients—in other words, falling into the method of treatment which I have tried to tell about this afternoon in my paper.

I cannot take the time to discuss some of the excellent points brought out in the paper of Dr. McMurtry. Suffice it to say, I endorse most of them. I want to take one or two minutes which I should have taken in reading my paper to allude to eserine and bowel obstruction.

Dr. Wetherill, Dr. Brown, and Dr. Craig have written papers on this agent, which have impressed me very much, although we differ in many respects. But in the main we are all working along the same line, and after what Dr. Craig and Dr. Boldt said,

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I believe that we are going to have our patients suffer less and get better results without being so anxious to use purgatives.

In regard to eserine, I have given it in a dozen cases at the Columbia Hospital, and in about eight where its effects were reported. One-fortieth of a grain of sulphate of eserine (John Wythe Brothers' preparation) was given about three o'clock in the afternoon; the operation having been completed in the morning, generally before twelve o'clock. I have been satisfied to get the patient to have a bowel movement the next dy. To sum up, I must say that eserine in nearly every instance seems *to have an effect*. But I am a little inclined to think that suggestions made by the nurse or by the house physician have had something to do with the effects in my service. I had two patients in the same room, one a negress and the other a white patient. There was a curtain between them. The negress had an operation for pus tubes, while the white woman had an operation for fixation of the kidney. I did not think it was necessary to give eserine to the white woman. The colored woman had eserine given to her, but her bowels had to be opened by enema the next day. "Suggestion" acted on the bowels of the white woman.

A physician, operated on for appendicitis, who vomited for four days previously, was given eserine in the afternoon. He said he must obtain relief from vomiting, as it prostrated him very much indeed. He was given eserine at 3.20 in the afternoon, and he said that in less than thirty minutes he had the sensation of a change of the peristalsis, which had been reversed, and eventually bile and stomach contents gradually began to pass the other way, and he was almost entirely relieved. As he felt so much relieved by the first dose of eserine, a second dose was given at his suggestion at 9 o'clock in the evening, six hours after the first, and he is now making a good recovery.

Dr. McMurtry (closing).—It would be unfortunate to assume from the discussion of cathartics in the preparatory and after treatment of abdominal operations that these agents are contraindicated, and to be wholly discarded. It is urged that a rational discrimination be observed in administering cathartics, and to point out that routine and excessive catharsis is both unnecessary and harmful when so applied. In this particular, as in other therapeutical processes, accumulating experience does away with unessential details.

I would add a word relating to Dr. Boldt's suggestion, which he has tested in practice, of allowing patients to be up on the second or third day and leave the hospital at the end of a week. There are several reasons why this should not be done in any case of abdominal section. An important one is the danger of hernia. While there are doubtless some cases that would be better for getting up early after operation, there is a much larger class that are positively benefited by remaining in bed longer than is now the custom.

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THE EMPLOYMENT OF CELLULOID PLATES FOR COVERING OPENINGS IN THE SKULL IN OPERATIONS FOR EPILEPSY, BRAIN TUMOR, ETC.

By William Perrin Nicolson, M.D.,
Atlanta, Ga.

It is somewhat surprising that in all the history of surgery practically no attempt has been made to protect with artificial coverings openings made in the skull by design or accident, though there is a universal belief upon the part of the laity that the insertion of silver plates is a matter of every-day occurrence. This has been so extensively accepted that it is not unusual to find physicians who also believe that this has been done. At the meeting of the American Medical Association in 1896, in the Section on Surgery, the writer heard the question asked if anyone present had ever known of the implantation of a plate for the protection of the brain. There was a universal negative reply.

Theoretically, the insertion of some means of protection should be an ideal procedure. In exposing the brain we deal with an organ which nature has most carefully guarded against force of impact, and irritation of its surface causes many of the most serious conditions for which we are called upon to operate. By the usual means of operating we in many instances substitute a pressure and resulting irritation for that which we are then removing, for we leave the impressible brain covered over by the scalp, and subjected to outside influences before impossible. While it is true that nature finally substitutes a partial protection in the

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form of a fibrous covering, this must of necessity by atmospheric pressure have been depressed before consolidation, and we have the renewed pressure, which we found necessary to remove, with the difference that in many cases the area of pressure is greater than the original. If, under such conditions, we are able to simply and rapidly cover openings of whatever size with an easily prepared plate, which is in itself unirritating, and is sufficiently unyielding to resist atmospheric pressure, and at the same time is elastic to a certain extent, we certainly have accomplished a great deal.

Such requisite conditions we find in celluloid, a material which remains indefinitely in the tissues without irritation or disturbance, and the physical character of which is such that it can be easily shaped with scissors to the required size and shape for adjustment to the opening to be covered. Its harmlessness in the tissues was demonstrated to me many years ago by the absence of any irritation from a celluloid testicle introduced by me into a patient's scrotum. Given such a material, we are enabled to enlarge the opening in the skull to whatever size we may desire, knowing that we can cover the opening and protect the brain from subsequent injury or from undue protrusion from want of support. In operations for epilepsy it not only protects the brain from subsequent pressure, but leaves an increased space, which is measured by the thickness of the individual's skull.

TECHNIQUE. The surgeon, according to his custom, will select the method of opening the skull which he prefers, whether by saw or rongeur. Personally, I prefer the De Vilbis rongeur where long incisions in the skull are to be made, and for enlarging or rendering symmetrical the opening already made I use the ordinary angular rongeur. The incision in the scalp should be of horseshoe shape, and sufficiently free in its sweep to give the desired room for enlargement in any direction that may be necessary, always remembering that it is far better to have the bone opening too large than the opposite. After completion of the oper-

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ation the plate of celluloid can be shaped to the opening with scissors, allowing sufficient edge to overlap the opening in the skull, so that it will rest upon the outer table of the bone. The plates I have employed are made from the convex top of an ordinary celluloid powder-puff-box, the convexity of which very nearly conforms to the arc of the skull. As boiling destroys the convexity, those that I have used I have sterilized by leaving over night in a solution of bichloride, 1:500, and transferring to a normal salt solution before the operation is begun. After shaping the plate as nearly as possible to the opening in the skull, three or four points are drilled obliquely through the bone, beginning about one-fourth of an inch beyond the edge, and coming out just about the margin of the inner table. Into these silver wires—No. 25—are passed and left in position. Corresponding openings are now drilled in the plate, and the inner ends of the wires are brought outward through these. Twisting the wires now draws the plate down snugly in position, and the twisted ends are cut off and bent so that they can be pushed under the edge of the plate. The scalp is now closed over by the ordinary method of the operator, though personally I always close these wounds with a continuous suture of plain catgut, because this renders it unnecessary to ligate any of the scalp vessels, and the even pressure of the continuous stitch controls the hemorrhage perfectly. It is well to bring a drain of gauze or a few strands of catgut from the space between the scalp and plate, as I have had to contend in two instances with quite a large serous collection at this point, that required several weeks for absorption. Healing is usually complete in one week, and the patients are out of bed in half this time. I have seen absolutely no irritation result from the plate in any instance, and I am certain that these patients are far more comfortable than those in whom the brain is left unprotected under the scalp. The cases in which I have so far applied these plates are five, whose histories are given on following pages.

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REPORT OF CASES. CASE I.—Cyst of the brain producing epilepsy. Mr. W., aged fifty years, received a compound fracture of the left orbital arch and frontal bone in a railroad accident twenty-three years before. Within less than a year he was seized with an epileptic convulsion, and these had been increasing in frequency and severity since that time, so that now he has had three or four within the last few months. His mental activity has been much impaired, and from formerly having been a fluent talker he now speaks with slowness and difficulty, finding much trouble at times in selecting his words. Diagnosis was made of cyst of the brain involving the frontal lobe of the left side, and extending backward toward the speech centre. As the opening in the skull for the removal of the cyst and exploration would be necessarily large, and knowing that it would result in such an unsightly depression in the patient's forehead, I gained his consent to carry out what I had long contemplated doing—the experiment of the application of a plate of celluloid. The skull was demonstrated to be very thick at the point of injury, and the thickened bone was cut out for a space covering an ellipse 1½ x 2 inches, extending from the superorbital ridge upward and outward. The cyst was found about the size of an English walnut, extending from the original seat of the fracture upward and outward toward the speech centre. The cyst was evacuated and drained, after scratching its internal wall at various points with a needle. On account of the extensive removal of bone the frontal sinus was opened, thus making a direct connection between the cavity of the nose and the brain. After stitching the dura in position, the outer end of the frontal sinus was packed with iodoform gauze and a notch was made in the inner end of the plate, which was anchored in position by the methods described above. The patient had a convulsion the night following the operation, but the course was otherwise uneventful. The gauze in the frontal sinus was left six days, and, after removal, the sinus gradually closed without

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trouble. A few months after operation it was impossible, across the room, to detect any evidence of the operation, the scalp lying evenly and smoothly over the plate, which was not discoverable except by close examination. The general condition of the patient has been excellent; there has been one convulsion since the operation.

CASE II.—M. F., aged twenty-five years; male. Jacksonian epilepsy. This patient had been operated upon three times for traumatic epilepsy, twice by Dr. McGannon, of Nashville, Tenn., and once by myself. He still has epilepsy, and his condition is supposed to be incurable. Hearing of the plate that I had inserted in the above-mentioned case, he consulted me with the view of having the opening in his skull covered. The examination showed three openings in the skull, somewhat irregularly joined, and extending over a large part of the Rolandic area. The brain pulsates freely, and he complains that he suffers at all times from the direct exposure of the brain to pressure and to blows, and even turning upon his pillow at night, when he lies upon this side, seems to precipitate convulsions. Operation April 20, 1904, at St. Joseph's Infirmary. Under ether a large, curved incision 12 inches long was made so as to encircle the whole area. The separation of the flap was difficult at some points on account of adhesions between the scalp and dura, but these were carefully separated over the whole pulsating surface. With rongeur the edges of the bone openings were cut away so as to make the openings more even and symmetrical. The bone especially thickened was cut away downward, showing the brain here to have been apparently compressed and its convolutions atrophied. The opening, when complete, was an ellipse 3 x 4 inches. The plate employed was a circle 3½ inches in diameter, being the bottom of a large puff-box, which unfortunately was less convex than the top, but it was selected on account of its larger size. This was perhaps a mistake, for the want of convexity permitted the atmospheric pressure to somewhat

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dent in the plate. Recovery in this case was uneventful, the patient sitting up in the yard on the third day after operation. Quite a quantity of fluid collected between the scalp and the plate, and on account of the too early absorption of the catgut drain. This subsequently disappeared without causing any trouble. The patient immediately felt better, and his tendency to convulsions grew much less. It was possible to tap upon this plate with the fingers without causing any disagreeable jar of his brain, and he was enabled to lie upon this side upon his pillow without any disagreeable sensation. Though this was done simply for the purpose of protecting his brain from external injury, and not with the view to curing his epilepsy, he called at my office a few weeks since, and left a message with the attendant that he was cured. I do not know how far this is true, but fear that it is a mistake.

Case III.—Jacksonian epilepsy. J. A. M., aged forty-five years, suffering from epilepsy resulting from a blow upon the side of the head received twelve years before. Diagnosis, brain cyst with resulting epilepsy. Operation May 10, 1904, at St. Joseph's Infirmary. Skull was opened over the slight depression where the injury originally was received, and a circle of bone 1½ inches in diameter removed. When the dura was opened quite a large cyst was encountered, practically as large as a hen's egg. This was evacuated and treated as in Case I., and the plate inserted by the same method. His progress was uneventful until the end of the first week, when he began to have increasing stupor, while at the same time there was a large collection of fluid under the scalp and over the plate. As his temperature was at the same time very high, it was feared that infection had taken place, but removal of the fluid showed it to be clear serum. Seeking further into the cause of this condition, it was found that his urinary excretion was very small, and this proved to be the cause of his stupor. He passed into a complete coma, and there was a total suppression of urine twenty-seven

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hours. Fortunately the excretion of urine began, and he gradually progressed to recovery, leaving for his home one month after operation. There was a large collection of fluid between the plate and the scalp, which required about one month for absorption.

Case IV.—Exploratory operation upon the brain. Mr. C., aged sixty years. Has been suffering for some months with vague symptoms of brain pressure, which could not be localized by any focal symptoms, except that optic neuritis and bulging of the left eyeball pointed to some pressure not far behind the orbit. There was also a motor oculi paralysis. Examination of the urine showed patient was also suffering from chronic Bright's disease. On account of his desperate condition, an exploratory operation was decided upon with the view to reaching any growth that there might be in the anterior portion of the brain. A large opening about 2 inches in diameter was made just above zygoma and behind the external angular process for the frontal bone. After opening the dura I was surprised to find to what extent the base of the skull and under surface of the brain could be explored with the finger. As my finger was removed the first time, there was a large gush of cerebrospinal fluid, which gave me freer access subsequently on account of reducing the intracranial pressure. The finger was passed inward in the anterior fossa of the skull until the anterior clinoid process could be felt distinctly. Passing it along the lesser wing of the sphenoid permitted exploration of the fissure of Sylvius. Passing the finger downward and backward the middle fossa of the base of the skull and the temporosphenoidal lobe could be felt in all their details. Next the entire surface of the cerebrum could be swept over with the finger up as far as the falx cerebri and back over the convexity of the cerebrum as far as the mastoid process. Nothing was discovered that was tangible except perhaps an increase of cerebrospinal fluid. As sometimes happens, in spite of the fact of no lesion being found, his brain condition was much

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improved, his intellect was clearer, and the eye paralysis improved. A plate was inserted as in the former cases; the healing was perfect without any change of the original dressing. Unfortunately, on the twelfth day after operation, this patient was seized with uræmic convulsions, and with intervals of only a few minutes' rest these continued until his death.

Case V.—J. A. P., aged thirty years. Was operated upon three months before by Dr. Floyd W. McRae for Jacksonian epilepsy, resulting from a compound fracture just behind the angular process of the frontal. By some means his wound was badly infected, and some months afterward continued to discharge from the sinus, extending down to the brain. For this condition he was sent to me by Dr. McRae, with the request that I operate upon him and insert a plate. Operation July 7, 1904, at St. Joseph's Infirmary. An incision was made, encircling the former one, and exposing quite an area of bone around the seat of the former opening. The bone was cut away to a circle about 1¾ inches in diameter, and adhesions between the scalp and dura, especially at the point of entrance of the sinus, were dissected away as well as possible. The dura was not opened except at the point of the sinus. The plate was inserted in the usual manner, but in spite of all precautions there was a certain amount of infection along the suture openings, though there was apparently no deep infection in the wound. In spite of all efforts there persisted a sinus, which discharged cerebrospinal fluid, which was treated by both Dr. McRae and myself for several months. Finally this closed, and a few days afterward he called at my office complaining of headache. Two days later I saw him at home suffering with intense headache, and very stupid. His relief from treatment was only temporary, his stupor increased steadily, and three or four days later, when seen by my assistant, he was found profoundly comatose, with a pulse of forty-five to the minute. He was moved at once to the Infirmary, and diagnosis made

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of brain abscess. In pressing against the plate it was found to be somewhat pushed outward by the intracranial pressure. Operation Sunday morning, at St. Joseph's Infirmary. Under ether the scalp incision was opened about along the former line and the plate quickly uncovered. There was no evidence whatever of any irritation or infection around the plate, but one of the wires which anchored it had been broken. Removing the plate showed the dura, which was rough at the time of the operation, to be perfectly smooth and uniform in its surface, but just in the centre of the area uncovered was a slightly discolored spot. Here a small opening was made with the point of a scalpel, and a pair of artery forceps were plunged into the brain through this opening, and, when their blades were separated, there was a tremendous gush of pus from an abscess in the brain. Introduction of the finger showed this cavity to be about the size of a hen's egg. A drainage tube was introduced into this cavity and brought out through a puncture through the centre of the flap, and the flap sutured in place. This tube was shortened from day to day, and finally the abscess closed entirely in about six weeks. The interesting feature about this case is that the patient now has a large pulsating area that was originally covered over by the plate, and it is so uncomfortable as compared with his former condition that, even though he has already undergone three operations, he asks that a plate be reinserted for the purpose of comfort and protection.

Though the duration of these cases does not give a long observation of results, I feel safe in making the following claims for the routine application of this principle to all operations where we are compelled to make openings of any size in the skull:

1. It is safe and does not add any extra risk to the operation.

2. It not only removes the pressure and irritation, which we are endeavoring to combat, but by its resistance prevents

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a recurrence from the subsequent consolidation of the coverings in a false position due to atmospheric pressure.

3. It protects the patient from external influences, and not only makes him feel safer, but he is actually safer.

4. It enables us to be much more untrammelled in the amount of bone that we can remove.

5. It prevents deformity, which, especially when beyond the hair line, is necessarily great in large bone removals.

DISCUSSION.

DR. JOHN C. OLIVER, Cincinnati, Ohio.—I have been particularly interested in this paper, because it deals with a condition which is undoubtedly responsible for a great many of the bad results in cerebral surgery; that is, the formation of adhesions between the membranes and the surface of the brain. The evil effect of these adhesions was recognized quite a number of years ago, and Dr. H. H. A. Beach, of Boston, was the first, I believe, to suggest the insertion of some foreign body (he suggested silver foil) over the surface of the brain to prevent the formation of these adhesions. After reading Dr. Beach's suggestion I did several operations on the brain in which I inserted gold foil in the area of operation. The gold foil that I used was of considerable thickness, but I do not remember just what its thickness was. I do remember that when placed on one end it would not crumble over upon itself. These gold plates were inserted in several cases.

I had the opportunity of making an autopsy upon a case in which one of these plates had been inserted, the original operation having been made for Jacksonian epilepsy. The autopsy was, I think, made about three years after the operation. I was very much surprised at the autopsy to find that almost all of the gold plate had disappeared, that nature had succeeded in causing the absorption of the greater part of it, so that at the time of the death of the patient the plate was represented by simply two or three little flakes of gold.

DR. CARR.—How long after?

DR. OLIVER.—Three or four years after the operation. It may be possible that the same result will occur with the celluloid plates. Dr. Nicolson's report indicates that the longest period that elapsed in any case has been eight months; so that it is too early as yet to say whether the celluloid plate may not share the same fate as that of the gold one. The adhesions in the case I had the opportunity of making an autopsy upon were as dense as they are in cases in which no plate had been inserted.

DR. W. P. CARR, of Washington, D. C.—I wish to say a word or two on this interesting subject. In one case I put in a

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piece of rubber tissue in that way to prevent adhesions, having operated on the man for epilepsy. The man had no attacks for about six months after the operation, then they returned and he wanted me to operate on him again. I did not want to operate, but did want to see what had become of the piece of rubber tissue I had inserted. After some months ineffectual treatment, I operated again and found that it looked just as when I put it in. It had not changed a bit. The adhesions were dense all around the rubber. I think there were more adhesions than if I had not put it there.

I have been interested in the paper of Dr. Nicolson, and he has probably furnished us a valuable suggestion for cases in which there is a deficiency of bone. We can get into the skull, however, through a very large opening and replace the bone without any difficulty. I use the De Vilbiss instrument for the purpose of making an osteoplastic flap in getting into the skull; we can make this flap of any shape or size desired. I have exposed and turned down a flap five inches long and four inches wide in several cases. This bone was left attached to the scalp, and simply replaced or put back into position. Even where there is a depression in the bone, when the flap is turned over, that depression can be split with the saw and pushed out, and the flap put back. I have done that on several occasions, and I think for that reason there would not be so much use for the celluloid plate as might seem at first.

I recently removed a Gasserian ganglion by the osteoplastic flap method, and I was surprised at the ease with which I could get at the ganglion, although it was more deeply situated than usual. The large opening afforded such an easy way of doing the operation, that I should never think again of going in through the base of the skull.

Dr. J. Shelton Horsley, of Richmond, Va.—I wish to report a case along the line of the one that has just been mentioned, because I think it is due the Association that every member who has had these cases should report them. They are not very common, and the clinical facts gathered from them are usually valuable.

The case I have reference to is one that was operated upon by another surgeon for so-called traumatic epilepsy. He informed me that he had inserted a thick gold leaf of the thickest size that dentists use. This was put between the dura and the edge of the wound, and tucked underneath the edge of the bone. The epilepsy was apparently cured, inasmuch as the child had no fits for some time, for probably over a year, at the end of which time the seizures returned and became as bad as they were before. I operated on the case somewhat against my better judgment, but was encouraged by the first operation which seemed to have benefited the child almost immediately. Then, too, the child was in an almost hopeless condition, the seizures coming on

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frequently, several every day, and I found somewhat the same condition that has been described. The gold leaf had been perforated in a number of places; pieces of it were curled up, and surrounded by granulation tissue. The adhesions were probably more dense than they would have been if no such material had been interposed. These adhesions were broken up, and as much of the gold leaf taken out as could be removed, and nothing inserted. The child recovered from the immediate effects of the operation, and obtained as much relief from spasms from the second operation as from the first apparently, although eventually the convulsions will doubtless recur.

DR. NICOLSON (closing).—Of course, the interposition of silver and gold leaf for the purpose of preventing adhesions in these cases has been done a great many times, and they have served their purpose very well.

The only object I had in doing this was to go further and try to overcome what we all know is true; namely, that frequently after operations for Jacksonian epilepsy, traumatic insanity, and such conditions as that, we find the patient greatly benefited at first, but subsequently, as consolidation begins to take place, and the bone is pressed in, and there is a newly formed fibrous tissue which is pressed in by atmospheric pressure, the patient is again in as bad condition as before. But with a view to overcoming this I was led to try celluloid. I have endeavored to find out whether anything of this kind had been done, and the only thing I could find was an allusion in an article by one physician in New Jersey to putting a piece of celluloid in the skull; and Dr. Gerster, of New York, once put gold plate into a patient's skull that contained $27.00 worth of gold. The plate was made to conform to the opening, and was inserted under the edge of the bone. Nine years afterward it was presented to the trustees of the hospital, as they had kindly furnished the plate to him that was put in the skull. That is the only authenticated case I have been able to get hold of.

As regards an osteoplastic flap, it is invaluable in many cases, where you know beforehand about the opening you make in the skull. In this class of work, as in other things, we start out with the expectation of making a small opening, but we are led on by widening the area of operation, and the first thing we know we make a large opening in the skull, and simply with a view of covering up these defects, and protecting the patient, I have advocated celluloid. I am satisfied in many cases nothing can be done so simply and quickly, unless it should be demonstrated that celluloid will be absorbed, but I do not believe it is an absorbable material. I have a patient who has been wearing a celluloid testicle for many years, and it is the same as it was when it was first introduced. I do not believe that the celluloid will be absorbed; and if it is, I shall take pleasure in reporting the fact to the Association that it has taken place.

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A PLEA FOR EARLY OPERATIVE INTERVENTION IN TRAUMATIC SYNOVITIS OF THE KNEE-JOINT.

By Edward A. Balloch, M.D.,
Washington, D. C.

In the writer's opinion it should be the function of an association like this to discuss the surgery of to-morrow rather than the surgery of to-day. In this forum unsettled questions should be debated and principles laid down which are not as yet the common property of the profession.

In accordance with this opinion I venture to ask your attention to one of these unsettled questions, and to submit for your consideration some of the conclusions concerning it which I have reached.

The question is this: To what extent are we justified in recommending early operative intervention in the ordinary injuries of the knee-joint accompanied by synovitis?

I exclude, purposely, those cases which undoubtedly demand operative measures, such as wounds, loose bodies, infected joints, etc., and shall confine my remarks to that class of cases ordinarily treated by so-called "conservative" methods. This includes sprains, synovitis, simple and gonorrhœal, and, in short, the entire class of cases without demonstrable lesions of the joint structures. The following may serve as types of the class of cases to which I refer:

Case I.—In October, 1902, a man, aged sixty-two years, in getting off a street-car fell and injured his right knee. Upon examination, eighteen hours later, the joint was found

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to be swollen and painful, but with no evident injury to bones or cartilages. A diagnosis was made of traumatic synovitis and the case treated by the usual methods of rest, cold, heat, massage, compression, fixation, stimulation, etc., with which we are all too familiar. The synovitis subsided after six months of persistent treatment, but up to the present the patient has been unable to dispense with a crutch. The joint is not enlarged and, although many examinations have been made by myself and others, no gross lesion of its structures can be found. Upon passive manipulation there is full range of motion, but, nevertheless, the patient is unable to bear any weight on the extremity, and this, too, in spite of the fact that his suit against the railroad company has been settled.

CASE II.—A woman, aged thirty years, while putting her child to bed and standing between a bed and the child's crib, suddenly turned around. The right leg being fixed between the bed and the crib caused the knee to be severely wrenched. Swelling quickly followed. Here again repeated examinations failed to show any evident lesions of the structures of the joint, and the case was managed as one ordinarily manages cases of synovitis, with the result that two years of pain, lameness, and discomfort passed before full use of the joint was obtained.

In cases like these one has, it is true, the doubtful consolation of feeling that he has managed them in full accord with accepted surgical principles. Nevertheless, there must arise in the mind of every conscientious surgeon a haunting doubt as to whether they would not have been treated better by an early resort to more radical measures. In the first case, for instance, operative intervention has been offered this patient as a last resort, after two years of pain and partial invalidism. Had it been offered as the first measure for relief, I am confident that the result would have been vastly better. The second case is cited as one in which a good result was finally obtained by non-operative means.

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There are many like it. The patient recovered, it is true, but only after two years of disability. Early operation would surely not have postponed the time of recovery and might have hastened it.

Why is it that we have such hesitation in invading the knee-joint? Is it because of the fear of infection and the serious consequences which may follow? The danger of infection is surely no greater and the consequences no more serious than in operations within the abdomen, chest, or brain; yet these cavities are invaded daily for far less weighty reasons than obtain in injuries of the knee. In these aseptic days should the knee be any more forbidden territory than any other serous cavity? If, by careful preparation, the use of rubber gloves, and the use of instruments in preference to the finger in exploring the joint, we cannot keep out infection here, we cannot keep it out anywhere and our technique is faulty somewhere and needs revision.

I may be wrong, but I am inclined to ascribe our reluctance to invade this joint to a lack of precise knowledge of its internal structure, and to a further lack of a thorough understanding of the amount of damage which may follow subcutaneous injuries. The joint is so complicated that even when it is opened and we have the cavity directly under our eyes it is not always easy to say what is normal and what is abnormal. A trifling derangement of its internal structure may present results in the way of pain and impairment of function out of all proportion to the amount of injury.

This same title, "Internal Derangement of the Knee-joint," which we find in all our surgical text-books, has always seemed to me to be a confession of ignorance which should not be allowed to exist longer. The time is ripe for a more precise knowledge of these derangements.

Is there such a thing as a pure sprain of this joint, or, if you please, an uncomplicated synovitis? I doubt it. I believe that every case of synovitis of the knee, or any other

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joint for that matter, is dependent upon some injury, greater or smaller, of its internal structures.

The *x*-ray has relegated to the limbo of things outworn many cases of "sprain" of the wrist-joint by revealing unsuspected fractures of the carpal bones as the true lesion. Its value in corresponding injuries to the knee is limited, unfortunately, by the fact that most of the damage in injuries to this joint is done to the ligaments and cartilages, and is not clearly demonstrable by this valuable agent. However, we may learn a lesson from its use in lesions of other joints, and this lesson is that the more carefully we examine these cases the fewer cases of "sprain" we find.

"Sprain" is a very comforting and useful word to the surgeon. It covers many of his sins of omission with a mantle of charity. It is fortunate for us that the public is imbued with the idea that "a bad sprain is worse than a break." It lets us down easily quite frequently. It is none the less our duty to study this question carefully and conscientiously.

Among the results of trauma to the knee affecting the capsule only may be mentioned hæmarthrosis, stretching of the capsule, chronic hydrops, stiffness, contractures and adhesions. Injuries to the ligaments and cartilages are responsible for another series of pathological conditions.

Tenny (*Annals of Surgery*, vol. xl., No. 1), in a most interesting and valuable paper, based on a study of 150 knee-joints in cadavers, gives a long list of internal derangements found in these joints. Among them were tabs from the lubricating apparatus, especially from the infrapatellar pad; erosion of cartilages; damaged and displaced semilunar cartilages and free and loose bodies, not to mention others of a minor character. It is probable that in each of these cases there was, during life, a "synovitis," and doubtless many of them were treated for that alone, it being left to the pathologist to demonstrate the underlying lesion.

How often do we hear the statement that a simple synovitis

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will recover quickly under rest, massage, etc.! I challenge this statement as misleading. In the first place, how can you tell that you are dealing with a simple synovitis? In the second place, I very much doubt whether such a condition ever exists. I firmly believe that if we could dissect carefully every swollen knee we should find some pathological reason for that swelling, and that an inflamed synovial membrane as the sole lesion would be conspicuous by its rarity.

Some one may say: "Why not aspirate?" Is aspiration less dangerous than incision? Personally, the older I get in the practice of surgery the less use I find for the aspirating needle as a diagnostic agent. In cases where I formerly used it I now make an incision, small or large, as the case may demand.

The British profession is proverbially conservative, but there is one member of it who is ahead of us all in this matter of the proper treatment of synovitis. I refer to O'Connor, of Buenos Ayres. This surgeon not only opens and drains his cases of purulent and gonorrhœal synovitis, but has extended this mode of treatment to traumatic and even to rheumatic arthritis. One cannot look over his reports of cases without being convinced that he is in the right. As he pertinently says: "When we meet with a decoction of staphylococci we rush to operate; but when we encounter a decoction of gonococci or rheumacocci, we nostrumize, because we entertain some fears of merely opening and draining a non-purulent joint."

By way of digression, I want to say here that I believe that in this matter of gonorrhœal arthritis, its proper treatment has been hindered by a name. It has been labelled gonorrhœal rheumatism and, as a consequence, these unfortunate patients have been made to swallow heroic doses of the salicylates and other antirheumatic remedies to the manifest detriment of their stomachs and without effect on the disease. There is no more reason for treating a gonorrhœal joint with the salicylates than there would

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be in so treating a gonorrhœal pus tube. Both are distinctly surgical affections. It is time that we stopped treating a name. At least let us change the label and call it a septic arthritis of gonorrhœal origin. If we do this, the treatment suggests itself—incision and drainage before the infection has had time to damage the joint irremediably. For several years it has been my routine practice so to treat all cases of true gonorrhœal synovitis in which I could obtain the consent of the patient to this procedure. I have yet to see the first case in which this course did not result in immediate improvement, and in a marked shortening of the duration of the disease.

I have never as yet deliberately opened and drained a purely rheumatic joint, but I lately did so, unwittingly, with a result which encourages me to follow O'Connor in this matter. The case is as follows:

A colored man, aged forty-nine years, was admitted to the medical wards of the hospital, with pain and swelling in the left hip. There was a vague history of former attacks. Present illness began six months ago, with pain in the joint, running thence down the thigh. Swelling began two months ago. Has been unable to bear any weight on left foot for six months. Right foot gone, as the result of a saw-mill accident. Tissues around hip distended. Skin tense and shiny. Pain on pressure and upon movement of the hip.

The attending physician saw him the day after his admission and thought the condition to be tuberculous and sent him to the surgical wards. I made what I must acknowledge to be a casual examination and concurred in the opinion of the physician. I operated a few days later. Upon getting through the skin I was much chagrined at not finding pus, as I had confidently expected. There was a little oozing of serum and that was all. I continued my search for the trouble, until I entered the hip-joint itself. There was no pus anywhere, and all that could be found in the joint was a dry grating, as if the synovia were lacking, the bones

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themselves being normal. The capsule and overlying tissues were closed, a small drain being left. The relief was almost magical. After the first twenty-four hours there was no pain, and in the course of ten days he was walking about the ward and bearing weight on the foot for the first time in six months. What I did to this joint to cause relief is a mystery to me, unless this was a case of old rheumatic arthritis, relieved by incision and drainage.

The following is selected from a list of several cases of traumatic arthritis treated by operative intervention, as typical of what may be done in these cases.

On October 4, 1904, I saw in consultation Mrs. E. W., aged forty-five years. In January, 1904, she slipped on the icy pavement, striking on left knee. She was unable to stand and was sent to her home in a carriage. The joint was swollen and painful for some time, but she managed to get around on it until May, when she began to suffer from acute pain, swelling, and stiffness, which increased to such an extent that she was obliged to take to her bed. She sent for her physician, who used all the accepted measures for her relief without avail. So long as she remained in bed she was comparatively comfortable, but as soon as any attempt to use the joint was made, the pain and swelling compelled a prompt return to bed.

Examination showed a swollen joint, measuring more than an inch larger than the right. Flexion possible to a right angle only. Pain on manipulation. Patella floating. Was unable to find any gross lesions of bones or cartilages. As her physician had faithfully tried all the accepted and some unaccepted measures for her relief, without the slightest benefit, I had only to suggest exploration of the joint to have it promptly accepted by both of them. She was removed to Sibley Hospital, and operation done October 13, 1904. Joint full of fluid. Mass of fat in joint, suggesting lipoma arborescens. Cartilage over external condyle eroded over one-half of its surface. The mass of fat was dissected out and

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the cartilage thoroughly scraped. The joint was closed with drainage. Recovery was uneventful. At last accounts, aside from a slight stiffness of the joint, it has fully recovered its usefulness.

Without further taxing your patience, I submit for discussion the following propositions:

1. In traumatic arthritis of the knee-joint there is, in most if not all instances, an injury to some of the structures of the joint.

2. Too much time should not be wasted in the trial of so-called "conservative" measures. While it is difficult to fix any arbitrary limit, three weeks is proposed as a fair time, beyond which the propriety of surgical intervention should be considered in cases which do not improve.

3. Arthrotomy, properly performed, is not an essentially dangerous operation.

4. Early operative intervention will give a greater proportion of useful joints in a shorter space of time than any other method of procedure.

DISCUSSION.

DR. E. DENEGRE MARTIN, of New Orleans, La.—I was very much impressed by the paper of Dr. Balloch in which he referred to a case of injury to the knee-joint that gave him considerable trouble. I had a similar experience not long ago.

I was called to see a patient, who had been treated for six weeks for rheumatism. She was suffering from excruciating pain in the right hip, so severe that she cou'd not turn in bed. She had been treated with salicylates and iodides, with no result. I concluded that there must be a septic arthritis, and had her removed to the sanitarium. The next morning, on opening the joint, I was very much surprised to find that it was apparently perfectly normal, so far as I could determine. The woman was completely relieved after opening and draining the joint. She made an uneventful recovery, and was able to walk, in three or four weeks afterward.

I have had quite a number of cases in which I have not hesitated to open and drain a joint, whenever I thought there was necessity for it. I believe in the majority of cases the tension is due to the accumulation of synovial fluid, with possibly some

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septic infection, and when aspiration is practised the fluid returns; and the quickest and most permanent results are obtained by drainage. My attention was called to the importance of drainage and the amount of injury a joint could stand, some years ago in a case of railroad injury. In this case the arm was crushed, the elbow-joint opened, the bones being entirely exposed. The contusion was so severe that there was quite a little gangrene of the tissues. Free drainage was established, and the arm was eventually saved. The patient had a useful joint. I believe in the present day, by aseptic treatment, with proper precautions, there is no reason why we should not open and drain these joints and prevent the erosion that will follow unless it is done.

Dr. Manning Simons, of Charleston, S. C.—I am interested in this paper on draining the knee-joint, because I have in several cases drained the knee-joint for gunshot wound. In examining into the experience of military surgeons as to gunshot wounds of the knee-joint, I find that their results have been almost universally disastrous from that treatment. I have had occasion four times quite recently to open up and drain the knee-joint, passing a drainage tube from one side of the joint to the other, for pistol-shot wounds. We were helpless in this class of injuries under the old plans of treating them, such as fixation, etc. In looking up the subject I found that military surgeons had invariably gotten bad results; but in my four recent cases I opened up the wound of entrance about the joint freely, passed a drainage tube through, sewed up the capsule, leaving the drainage tube in position, irrigated the joints two or three times a day, and in all four cases I got good results, with movable joints.

I was particularly interested in this paper because it sustains that plan of treatment for this class of injuries of joints, and from the experience I have had in those four cases I would not hesitate, under any circumstances, to make a free incision into the joint and practise drainage, with irrigation frequently, and, as I have had such flattering results in the cases mentioned, I shall follow that plan in the future. For the same reason I should be disposed to drain the joint in the diseases under discussion.

Dr. W. P. Carr, of Washington, D. C.—A comparison of military surgery with civil practice, in cases of knee-joint injury, is hardly right, because the conditions are so different, although in modern military surgery the results are getting better. Of course, we know that the rule in both armies, during the Civil War, was that a man shot in the knee must have his leg amputated, and that rule was carried out during the whole Civil War. But no one would think of amputating such knees to-day.

Dr. Balloch's paper refers to cases of comparatively slight injury to the joint, in which it is not necessary to drain, but

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simply open the joint and remove the piece of loose cartilage, wash out the effusion or bloodclot, or repair some slight damage. In many cases there is nothing found but a little fluid in the joint. In most cases it is only necessary to open the joint and wash it out thoroughly with some antiseptic solution, and then wash that out with salt solution, and you will get a good result. Almost all surgeons open gonorrheal joints, if they are at all serious, wash them out thoroughly, and close them. If the case is a bad one, they will drain the joint for days, and expect good results, and there is no reason why the same results should not be had in traumatic injuries of joints. The only trouble is to get the consent of patients to do it. There are many patients who would rather go on limping for a year or two than have their joints opened. When the injury is severe enough to confine the patient to bed, consent can be obtained. It ought to be done, and I believe in a few years it will be the general practice, if it is not now.

Dr. William E. Parker, of Hot Springs, Ark.—While this discussion has been going on I could not help thinking of the number of cases of gunshot wounds of joints we had during the Spanish-American War, particularly in fighting around Santiago, and in the first few of these cases we had we opened the joints and drained them; but it was unanimous opinion of the surgeon in charge, before we got there, that with bullets of small calibre, and of great velocity, such as were used, these cases did much better if the wounds were simply cleansed and dressed than when they were opened and drained. You will find this to be true if you will look up the reports made by the different surgeons.

As to the qustion of opening up joints for the relief of gonorrheal rheumatism, in Hot Springs we see a great many of these cases in a year, and I do not know of any more troublesome condition to handle than gonorrheal rheumatism. While you may be able to open up these joints in other sections of the country, without any impairment of motion of the joints, and that has been our own observation, yet if a surgeon should practise it there he would have lawsuits on his hands. I think it would be a good thing to remember the possibility of ankylosis.

Dr. Balloch (closing).—I have not very much to say. I presume all of the members have had cases of traumatic synovitis that have dragged along from one year to another as an unavoidable annoyance both to the surgeon and patients themselves. The point I wished to make was that in these cases there was some condition that kept up this prolonged state of irritation, and that condition can only be remedied by operative intervention, and knowing that fact we ought to intervene much sooner than we have been in the habit of doing.

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CASES IN WHICH EARLY DIAGNOSIS OF CANCER OF THE BODY OF THE UTERUS WAS MADE.

By Rufus B. Hall, M.D.,
Cincinnati.

Every surgeon appreciates the great advantage to the patient if an early diagnosis of cancer can be made. The more we appreciate this fact, the more we are stimulated to use every means in our power to accomplish the desired results in any given case. It is well known that patients suffering from cancer of the body of the uterus usually come to operators when the disease is so far advanced that an extirpation of the uterus, even if that is possible, does not promise good ultimate results. We all recognize the fact that if we are to get a permanent recovery from operations we should have the cases early, before the disease has invaded other tissues.

To show that an early diagnosis of primary cancer of the body of the uterus is possible—that is, that a diagnosis can be made while the disease is yet very limited in extent—I have the two following cases to report. Of the many cases of cancer of the body of the uterus coming under my observation only these two were seen early enough to make a diagnosis while the disease was limited to a very small area.

Adenocarcinoma was found to be the variety of the disease in each case. It is this form of the disease that most frequently attacks the body of the uterus, and if recognized early it promises great immunity from recurrence. The disease can be diagnosed in its incipiency if we system-

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atically curette every suspicious case and make repeated microscopic examinations of the scrapings removed from the uterus until we confirm or disprove the presence of malignant disease.

Mrs. B., aged fifty years, mother of three children, wife of a physician. At the age of forty-six and one-half years, after suffering from the reflexes of menopause for a half a year or more, she was annoyed by irregular bleeding between her periods. This continued for three or four months. The patient and her husband naturally became alarmed as to the cause of this irregular bleeding. The fact that she had a sister die at about the same age from cancer of the uterus made them suspect the same disease. Her husband examined her and excluded cancer of the cervix. He could not find any cause for the bleeding. The uterus was three inches deep. The patient was pale and anæmic, but rather fleshy.

On December 12, 1900, she was given an anæsthetic and the uterus was thoroughly curetted. The scrapings were carefully examined with a microscope by a competent man and pronounced negative. This curetting stopped the bleeding and she menstruated irregularly for five or six months. At this time the periods became prolonged and irregular bleeding commenced between the periods. She became anæmic from the loss of blood and was greatly depressed mentally for fear of cancer. The symptoms gradually grew worse and in January, 1902, another examination was made. She was given an anæsthetic, the uterus was thoroughly curetted and careful search was made for any roughness or irregularity of the inner surface of the uterus. The microscopic examination, like the former, was negative. The curetting controlled the irregular bleeding and she menstruated regularly for several months. The latter part of 1902 she commenced to lose too much blood at each period and soon afterward had irregular bleeding. Having received no permanent benefit from either of the curettings, and as the microscopic examinations were negative, she was not

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willing to have it repeated, therefore it was delayed for several months. The bleeding became almost constant and the anæmia was very marked. On April 1, 1903, she was curetted for the third time and careful microscopic examinations were made with the same negative result. The curetting, however, stopped the bleeding for a few months, when it commenced as before and continued, with more or less intermission, until April, 1904. At this time she was profoundly anæmic. She had not lost flesh markedly, but was very weak and was greatly depressed mentally. The uterus was three and a half inches deep and was very soft. She was curetted for the fourth time on April 12, 1904, for diagnostic purposes. At this time a little roughness was felt at one cornu of the uterus. With a small, sharp curette I was able to remove a piece of tissue about the size of a half a pea, which was whitish and hard. This was examined and found to be adenocarcinoma. The patient was subjected to a vaginal hysterectomy on May 5, 1904. The patient had an easy convalescence and is enjoying excellent health.

The clinical history of this patient, from the first, would lead the clinician to suspect malignant disease, yet the careful investigations made at each curetting gave negative results. I would not like to say that malignant disease was present from the first, yet it is possible that it was. After the uterus was removed and laid open the malignant growth was found to be almost perfectly round. It occupied the position indicated and extended from the mucosa to the peritoneal covering. It was embedded in the muscular tissue very similarly to a small fibroid. There was no other manifestation of disease, neither was there a single fibroid in any other part of the uterus.

The case is an interesting one from a clinical standpoint and should encourage us to persevere and try to make as early a diagnosis as possible in all suspected cases by curetting and careful microscopic examination of the scrapings.

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The second case, in which a diagnosis of a very small malignant growth was made, was that of Mrs. K., aged sixty-one years, mother of four children. She was referred by Dr. U. G. Murrell, of New Burlington, Ohio. The patient passed her menopause at forty-two years and had always enjoyed most excellent health. She is the wife of a farmer. Early in the year 1904 she commenced to complain of a little vaginal discharge, and later of a slight pruritus. In April she had a little bloody discharge, lasting for a day or so. She consulted her physician. He examined her carefully, suspecting cancer of the cervix. This was not found, neither could he discover any cause for the discharge of blood. Her general health was excellent. She had the bloody discharge three or four times up to the time of her visit to me on July 14, 1904. At that time the uterus was three and a quarter inches deep and was somewhat softer than it should be. She had a slight mucopurulent discharge and the pruritus of which she complained. I suspected malignant disease of the body of the uterus. She was given an anæsthetic and the uterus was thoroughly curetted. In the left cornu was a little irregularity. With a sharp curette I was able to remove a small portion of whitish tissue with the other scrapings. This bit of whitish tissue was not larger than half a pea, but was quite hard, differing from the other scrapings in that particular. The pathologist reported that it was adenocarcinoma. I was just leaving the city for my summer vacation, and for that reason the operation was deferred.

On September 8, 1904, vaginal extirpation of the uterus was made. The patient made an easy recovery. When the uterus was cut open the little growth was found occupying the muscular wall in the left cornu of the uterus and extending about two-thirds of the way through the muscle from the mucous surface. It was perfectly round and a small bit projected into the uterine cavity.

These cases are of unusual interest to the gynecologist.

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The early diagnosis of malignant disease in any part of the body, and especially of the uterus, is of the first importance. If we hope to get the best results possible in these cases from operative interference, the earlier the diagnosis is made and the radical operation performed, the better the ultimate results will be. Cancer of the body of the uterus is usually far advanced before the diagnosis is made. The causes of this are manifold. Occurring as it does about the menopause or soon after, when women are prone to attribute all irregularities and unusual discharges to the menopause, many of these patients do not consult their physician until the disease is far advanced. Many of the cases who do consult physicians are treated expectantly until they have a sharp hemorrhage or until the pain becomes so severe that they demand relief. All women about the menopause should be examined carefully just as soon as they commence to complain of an irritating or a bloody discharge at irregular intervals, or of any other symptoms referable to the pelvic organs. If no definite cause can be found in the vagina to account for the conditions and there is no disease of the appendages, the uterus should be examined carefully under an anæsthetic, a thorough curettage made, and a careful microscopic examination made of the scrapings. If the disease is one of simple or senile endometritis this is the correct treatment for it, and the sooner it is carried out the better for the patient. If malignant disease is present the diagnosis may be, and probably can be, made positive at this time. If, however, no cause can be found for the irregular bleeding at the time of the curettage and the microscopic examination of the scrapings is negative, and the symptoms return in two or three months or later, this process should be repeated. It should be repeated just as soon as the bleeding returns, until a diagnosis can be made or the patient cured. As stated previously, I do not know whether or not malignant disease was present at the first curetting in Case I. I am strongly inclined to doubt it, but she had the history of cancer in the

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family, and predisposition to malignant disease (whatever that means) was present. It may be possible that the malignant disease developed after the third curettage. I am wholly unable to decide that, but the symptoms and her condition justified the repeated curettings and careful examinations which were made to settle the diagnosis as early as possible. This woman may die in a few years from recurrent carcinoma, yet we have done the best for her that the present science of surgery offers, and made as early a diagnosis as possible.

In the second case we were fortunately able to remove some of the malignant disease at the first curetting, and she also had an early operation.

If the report of these cases stimulates other men to unusual efforts to make an early diagnosis in obscure cases of malignant disease of the body of the uterus, I shall feel repaid for my feeble efforts.

DISCUSSION.

Dr. Herman J. Boldt, of New York City.—The trouble with practitioners as a whole with regard to malignant disease is that sufficient care is not exercised in coming to a thorough understanding of what ails the patient. It is still customary for very many to look upon an atypical bleeding at about the time of the menopause as a perfectly normal condition and treat patients medicinally.

The narration of Dr. Hall's first case interested me very much, inasmuch as it recalls one patient of mine who had been treated for about a year and a half and two years, and upon whom I operated a year ago, doing a total hysterectomy for adenocarcinoma. I had the misfortune of operating upon the same patient again about two weeks ago for a condition which I thought might possibly be a suppurative process in the pelvis. Upon opening into the pelvis we found we had a suppurative condition present, but, at the same time, a number of carcinomatous glands. The peculiarity of that particular case was this: while the uterus showed adenocarcinoma, an examination of these glands showed squamous epithelium, an entirely different structure from that removed in the first instance.

So far as making a diagnosis in patients with carcinoma of the body of the uterus is concerned, we should invariably use the

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sharp curette, and curette thoroughly in the cornu of the uterus. Furthermore, when we have repeated atypical hemorrhages following curettage, although the pathologist may not call it carcinoma, yet, so far as my experience goes, these patients have in the course of time always developed adenocarcinoma, and if hysterectomy was not done sufficiently early, as soon as the disease is recognized, it was too late. When a woman, who has passed forty-five, who has had a number of curettings done, who has atypical hemorrhages, with the auricular glands becoming somewhat changed, with more of the epithelium being broken down, and some of the glands beginning to break down, although an absolute diagnosis may not be established, I have come to the conclusion that a uterus of that kind should be extirpated.

Dr. J. G. Ernest, of Atlanta, Ga.—This is an exceedingly interesting subject to us all, and I have for many years been impressed with the fact that those of us who attempt to instruct students in gynecology in medical schools have a grave duty in this respect. If we expect to have any improvement in this line, it must be done by impressing upon the young men that go out from our medical colleges to become general practitioners in the country the absolute necessity of disregarding the old-fashioned idea that these atypical hemorrhages, so often present, are necessarily a part of the menopause. I have been in the habit myself, of insisting upon a thorough examination being made whenever a woman has passed the menopause and she has a return after a few months of hemorrhages, no matter how slight, with a view to determining if that woman has cancer or not, because the experience of most of us who have had to do with this thing shows that in nine cases out of ten there is malignant disease present. The experience Dr. Hall has related here is the experience of us all in this line, and the necessity of early diagnosis is of prime importance. I believe with the gentleman who has spoken, that in every case, if thorough curettings have failed to arrest hemorrhage, the woman should have a complete extirpation of the uterus made rather than err on the other side. She is especially entitled to that. Under the present circumstances, total extirpation of the uterus by the vaginal route is so absolutely safe that it is hardly to be counted a very serious matter any longer, and I would, therefore, urge that the duty we owe to the country practitioners and to our patients should be fully discharged, by insisting that students and general practitioners should see to it that a thorough and satisfactory examination is made in every case that presents early symptoms of cancer, without waiting to temporize until it is too late to do anything.

Dr. Joseph Taber Johnson, of Washington, D. C.—The gentlemen who have just spoken have said what I intended to say, and it hardly seems necessary to repeat it. But we have no subject before us now that is of such great importance as the

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early diagnosis of cancer of the uterus. Those of us who have been in the habit of operating on this disease have many cases to lament, where the disease had progressed to such a degree that our operations have not been eminently successful. Many operators refuse to operate on cases of cancer of the uterus any more. I have heard good operators say that they absolutely declined to operate on cases of cancer of the uterus sent to them, because invariably the disease returned. The lesson we derive from that is that the only safety of the patient is in the early diagnosis so emphatically insisted upon by Dr. Hall in his excellent paper. The time to make this early diagnosis is when the patient has early symptoms; but in many cases of cancer of the body of the uterus, where the greatest hope lies of a radical cure, the symptoms are so obscure in the beginning that the patients drift beyond the aid of the surgeon before the diagnosis is made, so that, as Dr. Hall has said and others emphasized, when there is the slightest evidence of anything wrong, after the woman has entered upon or passed the menopause, examination of a radical character should be insisted on, in order to ascertain whether the hemorrhage is the result of malignant disease or not. That is our only safety. So I will close my remarks with the statement that we have no more important subject before the profession to-day than the early diagnosis of cancer of the uterus. Early operation is the only hope. If we put it off a little too long, the disease is bound to progress and operation may not be of any benefit.

Dr. Edward A. Balloch, of Washington, D. C.—This paper brings up a point that is interesting to me, and that is, To what extent ought the operator to allow his clinical judgment to be influenced by the microscopic findings? Dr. Hall did not say so, but I venture to assert that in this case in which there were bleedings after curetting he was practically convinced in his own mind that the disease was malignant; yet in view of the negative final report of the microscopist he waited. This is not always the fault of the pathologist; he may not have obtained a bit of the tissue that shows malignancy; nevertheless, every operator hesitates to remove the uterus in the face of an absolutely negative finding. In a case where there is suspicion of cancer of the uterus this should not stand in our way, when a woman has reached forty-five years, for she has no particular use for her uterus after that. I am fully convinced in these cases we ought to operate on suspicious instances of cancer, especially cancer of the cervix, and not wait for an absolute diagnosis. If we wait for an absolute diagnosis, we are generally too late.

Dr. J. Whitridge Williams, Baltimore, Md.—I have had considerable experience in examining for diagnostic purposes the material obtained by curettage and feel that I am justified in speaking upon the subject:

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In every instance it is necessary to distinguish between carcinoma of the cervix and that of the body of the uterus. In the former, digital examination and inspection will enable anyone to make a diagnosis; while in the latter the only method by which an accurate diagnosis can be made is the microscopic examination of the tissue removed by curettage.

I cannot agree with the speaker when he says that it is justifiable to remove the uterus upon the mere suspicion of the existence of malignant adenoma or carcinoma of the body of the uterus. In this condition the disease does not progress rapidly, and in every case in which the symptoms lead one to suspect its presence, the patient will suffer no harm by being obliged to wait long enough for the careful microscopic examination of the curetted tissue.

The greater my experience in the examination of scrapings for diagnostic purposes, the more convinced have I become of its great value, and I consider, in the present state of our knowledge, that we are not justified in operating upon a case of suspected malignant adenoma of the uterus unless a positive anatomical diagnosis has been made. Occasionally we see cases in which the hemorrhage persists in spite of repeated curettage, although careful examination shows no trace of malignant disease. In such instances, the condition is usually due to sclerotic changes in the uterine vessels, and the removal of the uterus may become necessary to check the hemorrhage, but of course, in such cases, we are not dealing with carcinoma.

I consider the occurrence of uterine hemorrhage in any woman past the twenty-fifth year as a most serious matter, and if a satisfactory explanation as to its etiology is not present I unhesitatingly recommend that the uterus be curetted and the scrapings be examined by a competent microscopist.

The main point in the discussion as to the value of the microscopic examination depends on the competency of the pathologist, as a correct diagnosis can often only be made by one who has had considerable experience in the matter. In this connection I might refer to a specimen which was shown me by Prof. William H. Welch, who said that it had been sent to him by a physician for examination, with the statement that it had been pronounced a malignant adenoma by one who was thought to be a competent observer.

A glance at the specimen sufficed to show that the supposed adenoma was simply the glandular layer of the decidua, and I promptly made a diagnosis of pregnancy instead of malignant disease. In this case our examination saved the woman her uterus and clearly demonstrated the necessity of careful differentiation in such cases.

As soon as the diagnosis of adenoma of the uterus is made, the organ should be promptly removed, as we can ordinarily

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promise the patient a satisfactory outcome, since experience shows that over 80 per cent. of such cases are completely cured, and present no signs of recurrence after a period of five years. On the other hand, when the carcinoma involves the cervix, the prognosis is much more gloomy, for no matter how promptly the uterus be removed, or how radical the operation, the chance of ultimate recovery does not exceed 10 or 15 per cent.

Dr. A. Palmer Dudley, of New York City.—I am not a pathologist, but rather a clinician, and, when I am working hard, I examine a large number of women clinically, and in order to get an accurate diagnosis in these cases of suspected malignant disease, particularly where there are irregular or atypical hemorrhages, it is not only necessary, but it is absolutely imperative, that the clinician should be the master of the case rather than the microscopist, for this reason: there are so many degenerate tissues that can be scraped from the inside of the uterus, which resemble one or the other family, that even the microscopist is sometimes mistaken as well as the clinician.

I agree with what has been said in regard to the use of the curette, but I go still further than that, and in order to be sure of the condition from a clinical standpoint, I would have the uterus sufficiently dilated, as I always do, to introduce my finger and find out what the condition is. Now, we say epithelioma of the body of the uterus, and that is the structure the microscopist is called upon to examine; yet, at the same time, we see carcinomatous degenerate fibroids within the walls of the uterus which the microscopist does not reach. We also see sarcoma developing in the body of the uterus which is not reached because it is without a mucous-membrane lining. We see disease beginning in the horns of the uterus within the mucous membrane, that portion especially running from the mucous membrane to the peritoneal surface; so that this question to which Dr. Hall has called our attention can be divided into four different conditions, with which it is absolutely necessary for us to become perfectly familiar.

We cannot always tell with the use of the curette, whether it be sharp or dull, that we have got a little spot which is just beginning to degenerate; but if we dilate the uterus sufficiently—and, as Dr. Williams has said, there is no need of hurrying it—which we can do in an aseptic manner, that uterus can be explored with the finger, and then whatever growth may be present can be discovered. Dr. Hall cited one case in particular where the growth was found within the walls of the uterus.

Just a word or two more. I did a vaginal hysterectomy upon a woman in New York over ten years ago. Dr. T. Gaillard Thomas was my consultant. I introduced my finger into the uterus and found it soft beyond the normal mucous membrane.

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I did a vaginal hysterectomy on this woman, whose age was seventy-one. Now she goes to Europe every summer and enjoys her trip. I got this case early. I had the structures examined and found only a shell of the remaining fundus of the uterus.

If I had curetted, I would have perforated the uterus with the slightest effort.

This is an exceedingly important subject, and the two or three cases reported called our attention to the fact that we should not be satisfied with the microscopic examination alone; although Dr. Williams reported a trite case in extenuation of delay. In these cases we should point out the necessity of having the uterus sufficiently open so that we can explore it with the touch, and that is one point that the essayist laid great stress on. No man would think of touching the ball of the eye to demonstrate what the retina was doing; neither would any man think of putting his finger on the tongue to know what the condition is of the nasopharyngeal cavity. We need to go farther than the examination of scrapings in these cases.

DR. HALL (closing).—I am very glad that my paper has elicited so much discussion, and I believe that most of the speakers agreed with me in the effort to make as early a diagnosis as possible in these cases. I do not, however, take as gloomy a view as one of the speakers has done, namely, that the operation is followed by recurrence in such a large percentage of cases that it is hardly worth while to operate on them, which one would infer from his remark.

I could report cases similar to the one mentioned by the last speaker, if time permitted. If we can only prolong life a year or two, an operation would be justifiable for the comfort it would give, or for prolonging the patient's life for that length of time. I recall one case of epithelioma upon which I operated. In this instance the uterus was so far involved that before I began the operation I expected that a curettement would be about all that could be accomplished, and this to control the hemorrhage. The attending physician urged the removal of the uterus. I told him that if I did that, I would remove it in pieces. This was done. It is now more than twelve years since that operation was performed, and the woman is living within a block of me. I saw her the other day. She is sixty-five years of age, and enjoying apparently perfect health.

I recall a case of cancer of the body of the uterus which was operated on late, yet the patient lived eight and a half years after the operation. The uterus was so large at the time of the operation that I had to do a combined operation, She died within the last eight months from malignant disease inside of the abdomen, although the eight years she enjoyed apparently perfect health, and believed she was going to be free from the disease.

Those are two cases I recall where the patients have lived a

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number of years after cancer of the body of the uterus. We know that the large majority of them will die within two years after operation. But nevertheless, for peace of mind and comfort, in the late cases I think operation is justifiable, and if we can get these patients while the disease is confined to a small portion of the uterus, we ought to exert every effort to do so; and who knows but what the span of life will be prolonged to six or ten years, instead of a few months or a year or two, as it is now?

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DECIDUAL FORMATION THROUGHOUT THE UTERINE MUSCULARIS: A CONTRIBUTION TO THE ORIGIN OF ADENOMYOMA OF THE UTERUS.

By J. Whitridge Williams,
Baltimore, Md.

As the name implies, the adenomyoma of the uterus is a tumor composed of non-striated muscle and connective tissue, through which are scattered varying amounts of epithelial structures. The latter may be present as glandular or tubular formations, which are visible only under the microscope, or as large, irregular cystic spaces resulting from their growth or dilatation, and often filled with blood-stained fluid.

The tumor occurs in one of two forms, either as a circumscribed mass, occupying the peripheral portions of the uterus and especially its posterior wall, and showing a tendency to become adherent to the surrounding parts, or as a diffuse thickening of the uterine wall, adjacent to and more or less completely surrounding its cavity. In either event the growth differs markedly in appearance from the ordinary fibromyoma, for it is intimately connected with the surrounding muscle, instead of being sharply marked off from the rest of the uterine wall by a distinct capsule, and consequently it presents on section an appearance suggestive of watered silk, in place of the dense, felt-like structure of the typical myoma.

From a purely clinical point of view, the growth in question differs but little from the ordinary myoma, and is of special interest in only a few particulars. In the first place

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its epithelial elements occasionally assume malignant properties and thus give rise to adenocarcinomatous areas, which are surrounded by myomatous tissue. Such an occurrence is of interest and importance as offering a satisfactory explanation for some of the rare instances in which fibromyomata appear to undergo carcinomatous transformation.

In the second place, the growth, particularly when it is situated upon the posterior portion of the uterus, shows a marked tendency to become adherent to and, in rare instances, to become incorporated with the surrounding tissues, thereby simulating the extension of a malignant growth. Thus, Kleinhans has recently reported two cases, in the first of which the growth invaded the upper part of the vagina, and in the second the wall of the rectum, but in neither instance did the microscopic examination reveal a distinctly carcinomatous structure. And lastly, owing to the fact that the adenomyoma sometimes assumes a markedly cystic character, it becomes a matter of importance to differentiate between it and other cystic structures occurring in myomatous tumors, particularly those resulting from the clogging and distention of lymph channels—the so-called fibrocystic tumors of the uterus. In all other respects the adenomyomata do not differ from the classic capsulated myomata, either in symptomatology, diagnosis, or treatment.

On the other hand, they are of very considerable interest from a purely scientific point of view, and since 1896 an abundant literature has developed in the attempt to determine the source of origin of the epithelial structures contained in them.

Although the first adenomyoma was probably described by Rokitansky in 1860, and a few isolated cases reported by Babes, Diesterweg, Schatz, Ruge and Schroeder, Hauser, Schottländer, and Breus, it was not until the appearance in 1896 of von Recklinghausen's monograph—*The Adenomyoma and Cystic Adenoma of the Uterus and Tubes: Its*

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Derivation from the Wolffian Body—that any general interest was taken in the subject.

In this article von Recklinghausen described 30 specimens in which epithelial structures were noted in the musculature of the body of the uterus, the uterine horns, or the walls of the Fallopian tubes—10, 13, and 7 cases from the several localities, respectively.

Leaving out of consideration the cases in which the adenomatous formation was limited to the tube wall, he pointed out that all the others showed a marked tendency to involve either the posterior wall or the neighborhood of the cornua of the uterus. Upon microscopic examination he found that the epithelial elements were surrounded and marked off from the adjacent tissue by areas of closely packed oval cells, which closely resembled in appearance those forming the stroma of the uterine mucosa, and he accordingly designated it as cytogenous tissue. The epithelial structures presented a varied appearance, some occurring as straight or convoluted tubules and others as irregularly shaped spaces.

These differences were so pronounced, and suggested to him so striking a resemblance to the secretory portion of the Wolffian body, that he identified the various structures with the secretory and collecting tubules, ampullæ, and pseudoglomeruli of that organ.

As the result of this fancied similarity, von Recklinghausen had no hesitation in attributing the epithelial structures in question to the inclusion within the uterine wall of portions of the Wolffian body, which had probably occurred at an early period of fetal life, particularly at the time when the Müllerian ducts crossed over the lower ends of the Wolffian bodies. This he considered offered a satisfactory explanation for the greater frequency of adenomyomatous growths upon the posterior wall and in the neighborhood of the horns of the uterus.

Accordingly, it is seen that he believed that the epithelial

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structures in question were derived principally from the so-called para-oöphoron of Waldeyer, instead of the sexual portion, or epo-oöphoron.

At the same time he was impressed with the marked similarity existing between the cytogenous tissue surrounding the epithelial structures and the stroma of the uterine mucosa, but in spite of this resemblance he had no hesitation in denying the existence of any generic relation between the two. In a postscript to his monograph, however, he stated that he had observed an additional case, in which the tumor lay just outside of the uterine mucosa, and which he believed was derived from the endometrium, the evidence in favor of such a mode of production being afforded by the fact that a distinct connection could be traced from the one to the other; so that he stated that in rare instances the adenomyoma might be of Müllerian or uterine origin, although the great majority were clearly derived from the Wolffian body.

Since that time the mode of origin of adenomyomata has been studied with great interest, and has given rise, particularly in Germany, to an exhaustive discussion, in which R. Meyer, Pick, Gebhard, Kossmann, and many others have participated. In America the subject has aroused less interest, as thus far only three authors have written upon it, namely, Cullen, Hirst, and Anspach. The same holds good for France, where Legueu and Marien, and Claise are the only investigators who have occupied themselves with its consideration.

With the exception of Cullen and Kossmann, who believed from the outset that practically all adenomyomata are derived from the uterine mucosa, all the other early writers accepted von Recklinghausen's views without question. As the subject became more thoroughly investigated, however, the majority of investigators, while still holding to von Recklinghausen's views, nevertheless admitted the possibility of the Müllerian origin of certain cases. This

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change of sentiment was very clearly exemplified in two articles written by Hartz in 1899 and 1901, respectively. In the former he held that all such tumors were undoubtedly derived from the Wolffian body; while in the latter article he admitted that he had gone too far, and that the evidence available at that time indicated that a very considerable number were of Müllerian origin, and that the exclusive views of the earlier writers called for revision.

In this paper it is my object to describe a case of unusual decidual formation occurring in a uterus, the seat of a placenta prævia, which to my mind offers conclusive proof of the extension downward into the muscularis of processes from the endometrium, which could readily afford the basis from which an adenomyoma might be derived.

The specimen was obtained from a colored multipara, who entered the Obstetrical Department of the Johns Hopkins Hospital April 15, 1901 (No. 866).

The patient was six months pregnant, and was brought to the hospital in a dying condition after repeated hemorrhages from a central placenta prævia. As soon after entrance as the necessary preparations could be made, the partially dilated cervix was still further dilated by Harris' method, the placenta perforated, and the child turned and extracted. During the operation there was only a slight loss of blood, and no further hemorrhage followed it. In spite of this, however, the patient died of acute anæmia two hours after delivery.

Description of Specimen. The internal genitalia were removed at autopsy (No. 1715) and preserved in alcohol.

Appendages on the right side: The tube measures 12 x 0.2 x 0.6 cm. Its fimbriated extremity is free, and it appears perfectly normal except for a few filamentous adhesions. Ovary: 3.5 x 1.75 x 1 cm. Surface smooth and covered by a few thin adhesions. On section no large follicles nor any trace of a corpus luteum are to be found.

Appendages on the left side: Tube 12 x 0.2 x 0.5 cm.

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Fimbriated end patulous. Appearance normal except for a few thin adhesions. Ovary measures 3 x 1.5 x 1.25 cm. in its various diameters. Its surface is smooth except at its lateral end, where a rounded projection 1 cm. in diameter protrudes from the anterior surface. On section this is found to be due to the presence of a corpus luteum, which occupies the entire lateral end of the ovary and measures 1.75 x 1.25 cm. It has a yellow rim 3 mm. in thickness and a whitish coagulated centre. The median end of the ovary contains a few small follicles, the largest being 3 mm. in diameter.

The uterus measures 21 x 15 x 7 cm. in its various diameters, and its body presents a roughly discoidal appearance and is sharply marked off from the cervix. The anterior surface of the body is convex and almost round, measuring 15 cm. from the fundus to the cervical junction, and the same distance between the insertion of the tubes. The posterior surface is flattened and more triangular in shape. The cervix measures 6 cm. in length and is 4 cm. wide and 2 cm. thick where it joins the body of the uterus.

On vertical mesial section the uterus measures 21 cm. in length, of which 15 cm. belong to the body and 6 cm. to the cervix. The walls of the former vary markedly in thickness, measuring 1 cm. at the lower uterine segment, 2 cm. at the fundus, and 3.5 and 3.75 cm. at the thickest parts of the anterior and posterior walls, respectively. The cervical canal is 5 to 6 cm. long and its walls measure 1.75 cm. at their thickest part. There is a Nabothian follicle 6 mm. in diameter in the centre of the posterior wall.

The interior of the body of the uterus presents a rough, jagged appearance, except for a smooth area which extends upward from a point 2.5 cm. above the internal os and covers the entire posterior wall for a height of 5.5 cm. This represents the decidua vera, while the rest of the interior, comprising at least five-sixths of the uterine cavity, represents the decidua serotina, and corresponds to the area of

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placental attachment. The remnants of the decidua serotina vary from 2 to 5 mm. and the decidua vera from 2 to 4 mm. in thickness. The mucous membrane of the cervix is not thickened and presents the usual appearance, though the folds of the arbor vitæ are somewhat less sharp than usual, probably owing to the manipulations to which they were subjected during delivery.

The muscular wall of the body of the uterus presents the felt-like appearance characteristic of the puerperal organ, and differs from the normal only in the fact that one sees scattered through it numerous whitish, round, or oval areas, which vary from a few millimetres to 1 to 1.5 cm. in diameter. These areas are sharply marked off from the surrrounding muscle and are most abundant in the inner half of the uterine wall, several extending directly up to the decidua. They can likewise be found in lesser numbers in the outer half, and the most external ones extend to within a few millimetres of the peritoneal covering of the uterus.

A section through the posterior portion of the fundus, just above the left cornu, shows that nearly one-half of the entire substance of the uterine wall in that locality is occupied by similar structures, several of which reach to within 2 mm. of the peritoneal surface.

Microscopic examination: Portions of tissue extending through the entire thickness of the uterine wall were cut from the following locations, and after appropriate preparation made into microscopic sections:

1. Midline of posterior wall, just above lower uterine segment, to show the structure of the decidua vera.
2. Middle portion of anterior wall.
3. Anterior wall, fundal region.
4. Posterior wall, fundal region, just above left cornu.

1. Sections show a well-marked decidua 3 to 4 mm. in thickness. Microscopically this consists of a typical compact and spongy layer. There is no trace of surface epithe-

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lium upon the former, which otherwise presents the usual appearance, being made up of tolerably closely packed, large, irregularly shaped epithelioid cells, with small, round, faintly staining, vesicular nuclei, and only a minimum amount of glandular tissue. The greater part of the thickness of the decidua is formed by the spongy layer. This contains large numbers of gland spaces, those nearest the uterine cavity lacking an epithelial lining, while those in the neighborhood of the muscularis are more or less completely lined by a single layer of cuboidal or flattened cells. As the muscle layer is approached, the decidual cells lose their characteristic features and resemble more and more closely the normal stroma cells in appearance, so that in the deepest part of the decidua one sees typical uterine glands lined by a single layer of cylindrical epithelium, and surrounded by a stroma made up of small, oval, or spindle-shaped cells, which are almost completely occupied by large, oval, deeply staining nuclei. The entire decidua contains many more round cells than usual, and here and there occasional polymorphonuclear leukocytes.

In the lower part of the section adjoining the lower uterine segment, and extending down from the unchanged endometrial tissue at the base of the spongy layer of the decidua, is a strand of endometrium 1 mm. in diameter and 8 mm. in length, which presents the characteristic structure of the normal non-pregnant mucosa, except that it is somewhat more abundantly infiltrated with round cells.

Almost immediately adjoining its lower extremity is a pale, oval area, 0.5 x 2 mm., whose lower margin extends to within 3 mm. of the peritoneal covering of the uterus. On microscopic examination this area contains in its centre a long, narrow, and irregularly shaped cavity, which encloses several irregular masses of granular material, staining brightly with eosin. It is partially lined by a single layer of epithelium, whose cells vary markedly in shape, some being low cylindrical and others so flattened as to

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resemble endothelium. The tissue outside of the cavity is made up of large, faintly staining cells, which are separated from one another by a considerable amount of structureless ground substance. Some of the cells are fusiform in shape, but the majority are round or polygonal; they present faintly staining nuclei, which vary in shape according to the general outline of the cells. These cells are identical in appearance with the decidual cells noted above, and can be identified with them without hesitation. Between them are numbers of small, darkly staining round cells. The area is sharply marked off from the surrounding muscularis, which forms an irregular wavy boundary. Nowhere is there any sign that the cells just described have developed from the surrounding muscle cells.

Scattered through this section are three other decidual areas presenting the same structure as the one just described, and differing from it only by their larger size.

2. In this section the decidua corresponds to the deeper portion of the spongy layer, as its superficial portions were cast off with the placenta. It contains numerous irregularly shaped glandular spaces, most of which lack an epithelial lining, and many are torn through and communicate directly with the cavity of the uterus. In the superficial portion there are numerous decidual cells, but toward the muscularis the tissue assumes the appearance of normal endometrium with typical glands and stroma. This tissue is not sharply marked off from the underlying muscularis, for the reason that numerous tongue-like processes extend down between the muscle bundles for varying distances—the most pronounced of which can be traced with the naked eye for a distance of 5 mm. from the lower margin of the decidua. Nowhere in this section are there any of the intramuscular decidual areas noted in section 1.

3. The decidua is thinner in this than in the preceding section, and corresponds to the outer portion of the spongy layer, and presents its characteristic histological structure.

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There are no down-growths from it into the muscularis, but scattered through the latter are numerous intramuscular decidual areas similar to those described in section 1.

One of these, which lies 8 mm. beneath the outer margin of the decidua, is fusiform in shape, measures 2 x 5 mm., and presents a cribriform appearance to the naked eye. Under the microscope it is seen to be made up of numerous irregularly shaped cavities, which are separated from one another by typical decidual cells. The majority of these spaces have no epithelial lining, but several of them are partially lined by a single layer of cuboidal or flattened cells. This area presents the characteristic appearance of the spongy layer of the normal decidua.

4. About one-half of the bulk of this section is composed of intramuscular decidual areas. The decidual lining of the uterine cavity presents the same appearance as in sections 2 and 3, and there are apparently no down-growths from it into the muscularis. The intramuscular decidual areas present the same appearance as in the other sections, though the epithelial lining of the glandular spaces is better preserved than elsewhere. One area, which corresponds in structure to the glandular layer of the decidua, is of particular interest, in that the portion of it immediately adjacent to the muscularis does not consist of decidual tissue, but presents the appearance of unchanged endometrium with typical glands and stroma, just as one often sees in the deeper portions of the compact layer of the normal decidua.

This observation is of interest from several points of view. In the first place, it is the first instance, so far as I can ascertain, in which such an unusually widespread distribution of decidual tissue has been noted. Moreover, it is clearly apparent from the study of the specimen that the Müllerian tissue from which it was derived could not have gained access to the depths of the uterine wall as the result of traumatism or any dislocation following the transition

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of the pregnant into the puerperal uterus—a possibility first suggested by von Recklinghausen.

Conclusive evidence of the correctness of this view is afforded by the fact that in the most peripheral portions of the uterine wall areas may be seen which are made up not only of decidua, but of tissue absolutely identical with the non-pregnant endometrium. By a stretch of imagination it might be possible for one to suppose that the decidual tissue had made its way downward from the lining of the uterus between the interstices of the muscle bundles during the contraction of the uterus; but, on the other hand, it would be inconceivable that such an explanation would hold good for the areas of unchanged uterine mucosa, since such a tissue does not exist in the uterus in the latter months of pregnancy. Accordingly, the only possible explanation for the occurrence of the latter would be that fragments of endometrial tissue had become included in the uterine wall, either during intrauterine life or at an early period of existence, and that they had later, under the influence of pregnancy, undergone partial or complete decidual transformation.

In the second place, the specimen appears to offer a valuable confirmation of the contention of those who advocate the Müllerian origin of adenomyomata; since it would seem that such a condition might afford the epithelial basis for the tumor in question, and all that would be needed for its production would be the development of myomatous tissue about such areas.

Moreover, to my mind this specimen offers much more convincing proof of the Müllerian origin of epithelial formations in the peripheral portions of the uterine wall than does the case described by Pick and Hirst, in which a small isolated epithelial stucture surrounded by cytogenous tissue lay just beneath the surface of the posterior wall of the uterus. In their case the only evidence in favor of such an origin consists in the fact that they assumed that the cytog-

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enous tissue surrounding it clearly indicated its Müllerian nature; while in my specimen the connection of many of these areas with the lining of the uterus could be clearly traced.

The specimen is likewise of interest from another point of view, as indicating that the displaced Müllerian tissue may undergo the same changes as the normal endometrium. Cullen and Lichtenstern have already pointed out that the blood contained in the cystic spaces of certain adenomyomata should be considered as menstrual in origin, and that the hemorrhagic changes observed in their walls were analogous to those occurring in the menstruating endometrium. This case offers conclusive evidence that endometrial areas, wherever situated in the uterine wall, may, under the influence of pregnancy, undergo decidual transformation, thus adding still further weight to the Müllerian theory concerning the origin of adenomyomata.

This is hardly the place to attempt an exhaustive analysis of the work which has been done concerning the histogenesis of adenomyomata. Suffice it to say that my own investigations upon the subject, coupled with a careful study of the literature, particularly Cullen's monograph, leaves no doubt in my mind that the vast majority of such tumors are undoubtedly derived from down-growths from the endometrium, though whether they are congenital or acquired later in life is a point very difficult of determination.

On the other hand, many competent investigators still hold to the Wolffian-body origin of most cases, though it does not seem that the evidence upon which they base their conclusions is always convincing; but at the same time it must be admitted that it is not always possible to demonstrate their incorrectness.

[NOTE.—Owing to unexpected delay in the preparation of the illustrations for this article it is published in this place without them. Those who are interested in the subject will find them in an article which will shortly appear in the *American Journal of Obstetrics*.]

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DISCUSSION.

DR. GUY LE ROY HUNNER, of Baltimore, Md.—This paper should not go by without at least a word of congratulation to Dr. Williams on having found such an important case, and a word of thanks from the Association on having such an important piece of work presented to it so clearly. The question has been debated for some years now, with the preponderance of evidence gradually accumulating in favor of the endometrial origin of adenomyoma, and a study of sections under the microscope has seemed to me to show conclusively that the glandular tissue out in the myomatous structure must be a direct continuation of the glandular tissue lining the uterus. But to have a case like this, which shows decidual tissue out in the myomatous tumor, certainly seems to help a great deal in clearing up this long-debated question.

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DEVELOPMENT OF FIBROIDS OF THE UTERUS AFTER ABLATION OF THE APPENDAGES.

By J. Wesley Bovée, M.D.,
Washington, D. C.

Medical literature teems with papers, discussions, essays, and books on the subject of fibroids of the uterus in their multiform variations. Fifty-three pages of the *Index Catalogue* of the Library of the Surgeon-General's Office were required to list the titles of the literary productions on tumors of the uterus received in that magnificent library previous to 1893. Of these fully three-fourths are concerning fibromata and myomata. In the *Index Medicus* the list is ever increasing and probably twice as many treatises have been published since as before the year mentioned.

Nor does the search for knowledge of uterine fibroids lose any of its energy. New facts concerning these tumors are constantly coming to light. Formerly they were considered benign from beginning to end. They were supposed to never begin before puberty or after the menopause. All these points have been absolutely refuted, at least from a practical standpoint. The large number of published cases of fibroid tumors that have undergone malignant degeneration, or that have broken down, become infected or undergone other changes in structure detrimental to the lives of their unfortunate possessors, have swept away the old ideas as to their benignancy. In fact, pathologists are now searching for a distinct borderline between benign and malignant, soft, uterine myomata. Recurrent myomata, while not so posi-

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tively dangerous as cancer, must be considered malignant. Between these and sarcomata there is not always a distinct difference. That they may appear before the establishment of womanhood has been abundantly proven. Even the single case of Sutton should go far toward convincing the heretic as to this fact.

He found a fibroid in the uterus of a childless widow, who had been twice married and who had never menstruated or shown any physiological evidence of ovulation. It had been there twelve years.

In 1898 (*The National Medical Review*, Washington, D. C., vol. viii. p. 1–5) I published a paper, probably the first, on the subject of fibroid degeneration of the uterus after double salpingo-oöphorectomy. It remains as the only paper on the subject in medical literature with the exception of a report of a case by Hey Groves, which will be quoted later in this paper. I have, however, noted incidental references to such cases like that of Ries in his most excellent article "On the Pathology of Stump Exudates After Salpingectomy" that appeared in the January (1895) number of the *American Gynecological and Obstetrical Journal*. The third case therein mentioned is: "Mrs. H. Several years ago removal of both tubes and ovaries. Since then development of fibroids in the uterus; 1897, vaginal hysterectomy (Dr. F. Henrotin)."

The cases I have had were as follows:

Case I.—C. B., colored, aged twenty-six years, both appendages removed for pyosalpinx of gonorrhœal origin (supposed) in 1895. Was ill but four weeks previous to operation; was married two months and had not been pregnant. The uterus at time of operation was of about normal size and not uneven on its surface. The following March, reported having had profuse hemorrhages from the uterus in January and February and severe and almost constant pelvic pain. An examination revealed an enlarged and nodular uterus; did vaginal hysterectomy by morcella-

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tion. The uterus was found much enlarged, probably three times its normal size, and studded with numerous small fibroids, none having a diameter of more than half an inch. These tumors were distributed throughout the body of the organ, being directly under the peritoneum and endometrium, as well as in the middle of the muscle wall.

CASE II.—Mrs. R., white, aged thirty-two years; married; one child fourteen years of age and no other pregnancy. This labor was followed by fever and she has since continually suffered with pelvic pain, profuse flow, and dysuria. In September, 1895, she had moderate fixation of the uterus, endometritis, and a doubly lacerated cervix. Curettement and trachelorrhaphy were then done, with the expectation of separation of adhesions of the uterus and appendages at the same time. However, when the abdomen was opened considerable pus was found in both tubes and the appendages were removed. The uterus was palpated, seemed in good condition, and was left. She did nicely and returned home in buoyant spirits. But about a year later she began to have considerable losses of blood from the uterus and pains through the pelvis. In December she called at my office and the uterus was found fully double its normal size and distinctly nodular. Hysterectomy was advised and, the following month, was done through the vagina and by morcellation. The uterus contained several very small fibroids.

CASE III.—Mrs. B. W., aged thirty-six years; multipara; was operated on for double ovarian dermoid cysts in November, 1899. Menstruation returned and with severity fourteen months later. It continued profusely with intervals varying from ten to twenty-two days until I saw her about eight months later. At this time the uterus was found to be more than double its normal size and nodular. Vaginal hysterectomy was done and eight small fibroids were found distributed through the uterus. Adhesions to the organ were marked.

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Case IV.—Mrs. W., widow, aged forty-six years; white; had had both appendages removed in another city six years before she consulted me in June, 1903, for severe pelvic pain, frequent urination, and profuse and irregular uterine hemorrhages of two years' duration. The irregular-shaped uterus extended nearly to the umbilicus and was removed by morcellation by the vaginal route.

The case reported by Hey Groves (*Obstetrical Transactions*, London, 1903, vol. xlv. p. 136) previously referred to was as follows:

Fibroid Tumor of the Uterus Developed After Both Ovaries and Tubes had been Removed for Independent Disease (Dermoid Cyst). A woman, aged forty-five years, had had four children, the last six years ago. In November, 1898, she suffered from pelvic pain and abdominal swelling caused by an ovarian tumor. Both ovaries and tubes were removed completely. The right ovary contained a unilocular dermoid cyst; the left ovary was cystic. Complete amenorrhœa followed for thirteen months. In December, 1899, bleeding occurred, lasting six days, with clots and pain. Menstrual periods then occurred with intervals of five weeks, then four weeks and, in 1901, three weeks, the length of period remaining six days and the pain being very severe. In April, 1901, the uterus, containing a fibroid about the size of a small fetal head, was removed by abdominal hysterectomy. The mass removed weighed one and a half pounds and was nearly spherical, measuring three and one-half by four inches. A single, densely hard fibroid tumor occupied the posterior wall of the uterus. No trace of tubes or ovaries could be seen. The patient recovered and is now in good health.

Of these 5 cases 2 were operated on for non-infectious disease, 2 were victims of infection, and in 1 the condition requiring removal of the appendages is not known. It may be suggested that these growths antedated the disease that involved the appendages or developed coincident with it—that they were present at the time of operation. This may

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be the truth. It is by no means impossible for uterine fibroids to be so small as to escape detection by palpation of the uncut uterus even with fingers in the peritoneal cavity. As evidence against it, however, it may be said in such case they must have been exceedingly small to thus escape detection. It may also be said that their development, apparently entirely after ablation of the appendages, is contrary to the opinion formerly held by most gynecologists, but now by but a few. It casts a strong shadow of unbelief on the efficacy of removal of the appendages to produce atrophy of uterine fibroids—an operation that gained such a foothold on the European continent and found many adherents in this country. It is very common for gynecologists having large clinics to frequently see cases of good-sized uterine fibroids that the possessors have not been cognizant of until many years after cessation of menstruation.

Does the sudden change in the pelvic circulation incident to the ligation of the utero-ovarian bloodvessels in double salpingo-oöphorectomy act as a cause of the subsequent fibroid degeneration of the uterus? This question may be reasonably answered negatively, else such degeneration might logically be seen commonly instead of rarely. Yet it may be possible that hemorrhagic infarcts in the uterus may occasionally in that manner be formed that will result in hyperplasia of connective tissue and be the origin of fibromata.

Whether in the process of uterine atrophy etiological factors of this condition arise is very improbable, though the possibility must be admitted.

That the formation of pelvic adhesions incident to appendage disease, particularly when of infectious nature, may cause fibroids is possible. But here again must be considered this very common condition acting as a cause of a very rare one.

Does the infectious process of the uterus of some special degree or variety gradually bring about this fibroid degeneration?

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This seems highly probable, though problematic.

A cursory consideration of the changes in the uterus after ablation of the appendages in the lower animals may be interesting in this connection. I quote from a paper published by Hunter Robb (*Cleveland Medical Gazette*, May, 1898). Solokoff (*Arch. f. Gynäk.*, 1896, Band li., Heft 2) noted the following changes in the uterus after bilateral castration in bitches: 1. Marked changes in the muscular layer, which is the chief constituent of the uterine wall. (*a*) Atrophy in the circular layer, setting in as early as six weeks after castration. (*b*) Disappearance of muscle fibres in the longitudinal layer, the fibres being less close than in the corresponding layer in the normal animal. The layer is diminished to half its normal thickness. 2. No changes in the vessels. The atrophy increased in direct proportion to the time which had elapsed before the dogs were killed.

In specimens removed from a dog killed fourteen months after operation the following were noted:

1. There is no trace of atrophy in the mucosa.

2. The circular layer does not present so broad a ring as in normal specimens. It is thin and the muscle fibres separated and in places broken.

3. The vessels are much altered. They are much thickened; their lumen is narrower than normal, and many are obliterated. The intervening tissue is atrophied to such an extent that the vessels often touch one another.

4. The longitudinal layer has almost entirely disappeared.

He shows atrophy begins first in the circular layer and is intense. In the longitudinal it is slower, but continuous. The mucosa remains unaltered. Neither fatty degeneration nor albuminous clouding was noted, but there is much change in form in the individual muscle cell. The fibrillary substance has disappeared, and only the nucleus and a granular protoplasm are left. Solokoff reasons that the effect of castration upon the uterus is manifested through the nervous system, since decreased blood supply, the only other assignable

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reason, does not result from ligation of the ovarian arteries, and since the direct connection between the ovaries and the uterus remains. In castration this connection is broken. Moreover, Rein has demonstrated that isolation of the uterus from the central nervous system by severing the branches of the sympathetic or the sacral nerves has no influence on nutrition of the organ, and again this atrophy occurs after the function of the ovaries has disappeared at the menopause. As the ovaries are the points of departure for stimuli to the uterus, their removal stops the functions of the uterus, which are necessary for the preservation of any muscle. Gottschalk (*Arch. f. Gynäk.*, 1897, Band liii., Heft 2) and Kleinwachter corroborate Solokoff's contention.

In the uterus of a woman removed three months after castration, Benckeiser noted an endarteritis obliterans to which he referred the atrophy noted. Gottschalk found in another specimen, removed eighteen months after removal of both ovaries for bilateral gonorrhœal pyosalpinx, atrophy was greater in the corpus than in the cervix. The individual muscle cells showed a decrease in the size of the body and of the nucleus. The intermuscular tissue was increased, but he could not decide whether he was dealing with a progressive fibrillary metamorphosis of the muscle cells or the end products of an old inflammatory process. The endarteritis found by Benckeiser he could not discover, though he did note a marked folding of the intima of the larger vessels corresponding to the functional diminution in the size of the lumen produced by an increased tonus in the vessel wall.

From these experiments and investigations one can find but one theory upon which to base a cause for the development of fibroids after double salpingo-oöphorectomy—that is, the endarteritis obliterans noted by Benckeiser. I wish the relation was clearer and more cases could be cited in substantiation. In all the cases of development of fibroids of the uterus after removal of the appendages cited in this paper the tumors were multiple, showing the existence of

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a number of foci; and pathologists have, I believe, been interested in endarteritis obliterans in the uterus as the origin of fibroid tumors. The cases of such development of fibroids after castration are probably rare, and their existence must be due to some rare cause such as is this form of endarteritis. In the absence of a better explanation I am disposed to accept this one.

DISCUSSION.

DR. J. WHITRIDGE WILLIAMS, Baltimore, Md.—I hesitate to criticise the title of anyone's paper, but I feel that I am justified in so doing in this instance. Judging from the title of Dr. Bovée's report I was led to believe that he was about to describe an atrophic condition of the uterus associated with the disappearance of the muscular fibres and their replacement by fibrous tissue. In reality, what he described was merely a uterus in which myomatous nodules had developed after oöphorectomy, and I would therefore suggest that the title be amended so as to give a clear idea of the condition, such as "The development of fibromyomata in the uterus after oöphorectomy."

Regarding the etiology of the tumor formation in these cases, I am not prepared to speak, for at present we know almost nothing concerning the ultimate cause of the development of myomata even when the ovaries are present, and naturally we know much less about it after their removal. I do not, however, believe that the explanation offered by Dr. Bovée can be accepted without question, for the reason that in the vast majority of uteri containing fibroids there are no changes in the blood-vessels. If I understood correctly, there was an obliterating endarteritis in his specimens, and if this was the cause of the formation of the fibroids, we should meet with them much more frequently than we do, as we know that the uterus of every woman who has had children presents a similar change. During pregnancy the uterine arteries increase markedly in size, and after labor they are too large for the amount of blood needed to nourish the uterus, and accordingly their lumina become diminished in size by the formation of connective tissue just beneath the endothelium—a compensatory endarteritis. In a subsequent pregnancy this is slowly absorbed and the vessels resume their former size. This condition was described by von Recklinghausen many years ago, and affords a ready anatomical method of distinguishing the uteri of women who have borne children from those who have not. This being the case, it seems to me that one should hesitate to ascribe the formation of the

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myomatous nodules in Dr. Bovée's specimens to such a condition.

Dr. Bovee (closing).—I stated, when I began to read my paper, that its title was misleading, and that some change should be made in it. I threw out this suggestion about endarteritis obliterans as being the cause, because I could see no other, and I do not think the character of this endarterities is just the same as the physiological process that goes on just after parturition, where we have such extremely large vessels, a large uterus, etc. While it may be just the same, it seems to me it is not. I cannot account for any cause for this. I had hoped to hear from some other gentlemen having had considerable experience, and having studied this subject more carefully and better than I have, and offering suggestions. I am sorry I have not gleaned any information on the subject this evening.

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THE EFFECT OF SUSPENSIO-UTERI ON PREGNANCY AND LABOR.

By Joseph Taber Johnson, M.D.,
Washington, D. C.

It will be impossible in this brief paper to consider in detail the various operations which have been proposed for the surgical treatment of retrodisplacements of the uterus. Their great number, at the present time somewhat over fifty, very clearly indicates a lack of unanimity on the part of the profession as to what is the best method of treatment.

Operations for holding the uterus in a fixed position, or suspended by artificial ligaments or adhesions, or by shortening existing ligaments are advocated with equal force and persistency by some, through the vaginal route, and still other equally good and conscientious surgeons advocate in the most emphatic language the relegation of these procedures to the limbo of innocuous desuetude: opposing the opening of the abdominal cavity by any route, and teaching that the retroverted uterus should be drawn up into its normal position by pulling upon its round ligaments through an opening in either groin.

When so many doctors disagree, who among us is to decide? The middle ground will probably be selected by the conscientious and conservative operator, who will be bound by no rule, but will aim to suit each particular need which presents, especially if he is fortunately not an inventor or modifier of some of the half hundred operations above referred to for the cure of one condition.

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The error, I have no doubt, is very often made of considering the displacement of the uterus the whole trouble, and an operation honestly commenced with its replacement and retention only in view, when the fact is in the great majority of cases co-existing pathological conditions are crying more loudly for relief than the uterine malposition.

Adhesions very difficult or impossible to successfully deal with by the Alexander or vaginal route are too frequently met with, after a diagnosis even that none existed; chronic inflammatory and suppurative disease of the uterine appendages often co-exist with bound-down retroversions, which could never be cured by the Adams-Alexander operation, and which only an expert like Dr. Goffe or the lamented Pryor could successfully treat through a vaginal entrance into the abdomen.

In a recent presidential address, Dr. Dorsett, of St. Louis, in speaking of 212 operations for retroflexio-uteri in a clinic for female diseases in Berlin, states that 98 were ventral fixations, 90 vaginal operations, and 24 Alexander operations. Of these 212 operations, 155 were done in connection with other operations and 57 for retroflexio uteri only.

In regard to this subject, Penrose, whose book on *Diseases of Women* is endorsed by many medical colleges, says in his last edition, published this year, page 143, that "many cases of retroversion of the uterus that require operative treatment are complicated by salpingitis and pelvic adhesions, though these extrauterine conditions are very often not recognized by bimanual examination before the abdomen is opened;" and, again, "The two operations that have deservedly met with the greatest favor are ventrosuspension and Alexander operation;" and after some further discussion of the subject he declares that "the field for Alexander's operation is very limited," not being applicable when there are adhesions or disease of the tubes or ovaries requiring operative treatment, and that "the operation that at present seems to possess most advantages for the cure of

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these cases of retroversion of the uterus that cannot be cured by the pessary is the operation of ventrosuspension."

Dr. E. C. Dudley, who is President of the American Gynecological Society, says in the last edition of his *Gynecology*, published this year, on page 670, that "Alexander's operation is only permissible when the operation is not complicated by a tumor, inflammation of the uterine appendages, adhesions, or other impediments to replacement;" and further, on page 683, when speaking of the relative merits of abdominal hysterorrhaphy and Alexander's operation, says "shortening the round ligaments is limited to those cases of slight descent with retroversion or retroflexion in which the uterus is replaceable, free from troublesome adhesions, and not complicated by tumors or diseased appendages. The indication is restricted still further by the exclusion of cases which can be treated satisfactorily by mechanical support or other less radical measures. The field, therefore, for the operation is not very great."

He also states that the contraindications of Alexander's operation become at once the indications for abdominal section and hysterorrhaphy. Hence the field for this operation is much wider than the round ligament operation.

Dudley also says it would be unprofitable to detail the innumerable operations which have been devised and performed in the treatment of posterior malpositions of the uterus. Some of those he says are not without merit, some are useless, and many are injurious.

Garrugus, on page 477 of his *Diseases of Women*, third edition, after speaking of the many methods of treating this condition, says "shortening of the sacrouterine and the infundibulopelvic ligaments has also been attempted for the correction of retroflexion, but without success."

I have been somewhat surprised recently to hear in medical society discussions and to read in some of the medical journals very severe and what has seemed to me quite unreasonable denunciations of the suspensio-uteri operation.

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Of course those surgeons who have invented operations, or those who think they have improved those operations by some slight modifications, might be reasonably expected to advocate the more general adoption of the work of their fertile brains and dexterous hands, but when our most recent and most approved authors declare that ventral suspension is the best operation for the radical cure of most of the cases of retrodisplacements of the uterus it is a little difficult to understand the opposition to what has appeared to me to be the most simple and at the same time the most perfect in its results of all the operations proposed for the cure of this condition. When I say most of the cases of course I admit that many of the other proposed surgical procedures have a very appropriate but more limited field of usefulness than ventrosuspension.

The two principal objections made to the suspensio-uteri operations are its supposed effect upon pregnancy and parturition, and also that the suspensory ligament which finally holds the uterus in an approximately normal position is liable to entangle the intestines in a fatal obstruction or inflammation.

Among the thousands of suspensio-uteri operations which have been successfully performed I have heard of only three such accidents, and these may have been the result of imperfect or inexperienced work.

Few major operations are always successful in the early work of the inexperienced, and probably no department of surgery has so many devotees who think they know it all, and many of whom lack the training necessary to universal success.

But admit for the sake of argument that these two or three cases of fatal obstruction of the bowels followed the operation of our most expert surgeons, what would become of all the great abdominal operations, and many other of the proudest achievements of modern surgery, if a similar test of their preservation were applied?

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It strikes me that it would be wiser to try our best to perfect so authoritatively approved an operation as suspensio-uteri than to try to replace it with one of those "innumerable substitutes" of which Dudley says some of them are not without merit, some are useless, and many are injurious.

I come now, Mr. President, to consider the chief objection to this operation which is mentioned as the title to this paper, "the effect of suspensio-uteri on subsequent pregnancy and labor."

My contention will be that very few injurious effects need be feared. That it sometimes fails to cure is true, but that is not the charge.

By ventral suspension I do not mean ventral fixation; I am free to admit that the uterus should not be securely fixed into the abdominal wound, or to the abdominal wall in women likely to become pregnant. It is quite certain that some of the pains of pregnancy and difficulties of labor which have been charged against suspension were really results of fixation. The operation of suspension in this country and largely abroad is known as "Kelly's operation," and it is fair, therefore, that he should be quoted as to the result of his own operation upon pregnancy and labor.

He says on page 157 of his *Operative Gynecology*, "I have heard from forty-nine married women upon whom I have performed my suspensory operation at a date sufficiently remote to form a judgment as to the result. They reported 14 cases of pregnancy, and in only 1 of these was there any complications attributable to the suspensory operation." In that case the uterus was suspended not by the fundus, but by the ovarian ligaments. The womb became infected, the ligatures were discharged, and the uterus was bound to the abdominal wall by *broad dense adhesion*. This woman had an instrumental delivery; puerperal fever followed; an exudate was removed from the left side of her abdomen; she however, recovered. This is the only case of dystocia following Dr. Kelly's suspensio-uteri operation reported in his

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book, and this he says was one of his first Baltimore operations in which the uterus was suspended by the ovarian ligaments instead of the fundus.

Penrose, in a note following his chapter on this subject on page 147, states that in the seven years between 1893 and 1901 he and his assistants performed ventrosuspension 310 times.

Of the twenty women who reported that they subsequently became pregnant and went to full term the course of pregnancy was normal and the children were all born alive; one woman had a prolonged and difficult labor, though forceps were not used. The operation of ventrosuspension seems to have had nothing whatever to do with producing the eight miscarriages reported. In fact, the number of miscarriages is small for any series of 310 women, most of whom were of the dispensary class.

In a second note Penrose says: "Since collecting the statistics in the preceding note we have continued to perform this operation in all cases of retroversion suitable for operation with equally satisfactory results."

In the face of such testimony from Kelly and Penrose it is difficult for me, at least, to understand how a prominent writer on this subject in the last number of the *American Journal of Obstetrics* can say in his last paragraph: "While ventrosuspension and ventrofixation have been condemned as unjustifiable," etc. He says near the end of his paper, however, when speaking of the multiplicity of operations, "We certainly are at a loss as to the choice of operations." He continues: "In my opinion we should not consider any operation which does not contemplate the possibility of a thorough inspection of the adnexa from above the pubic bone. I would discard," he says, "the entire class of operations that contemplate vaginal incision either anteriorly or posteriorly," etc.

Recently my friend, Dr. I. S. Stone, of Washington, read a paper on this subject in which he collected and summarized

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733 ventrosuspensions done by Washington surgeons. Of this number 49 subsequently became pregnant.

It is proper to state that most of the surgeons furnishing these statistics included a certain number of fixations with their report of suspensions.

Indeed, the majority of operators do. It is not at all unusual to find in medical journal articles the words "fixation and suspension" used synonymously. The difficulty is, therefore, greatly increased when we try to accurately ascertain from medical reports the definite responsibility of either operation for the causation of dystocia.

In one of these cases Dr. Fry, who is also a member of this Society, suspended an adherent, retroflexed incarcerated uterus during pregnancy and thus prevented complications, and she went to term. Dr. Howard Kelly reports a similar case, who, though an epileptic, went on to term. Instead of these suspension operations interfering with their pregnancies, they prevented the varied conditions charged against the operation.

In Dr. Stone's report three other suspension operations were performed during pregnancy.

In over 100 suspensions done by myself I only know of two pregnancies. They were both normal. In one case the labor was so rapid that the child was born before the doctor's arrival, and I know from recent examinations that there has been no return of the retroversion. The other case I delivered in November last after a five-hour normal labor without chloroform or forceps.

In 1896 Dr. Noble, of Philadelphia, collected the history of 1016 cases of suspensio-uteri operations done in this country with the object of determining the effect of this operation upon pregnancy and labor.

Of this number both ovaries were removed in 198 cases. In 808 cases at least one ovary remained, so that pregnancy was possible. Among the 808 cases of suspensio-uteri there were 56 pregnancies. There were 6 abortions. Seven

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women remained undelivered at the date of Dr. Noble's paper, and 43 were delivered at full term.

There was "only one death attributed to the operation," and that followed a Porro operation done by Dr. Noble on a woman who was septic when the operation was performed. She died of septicæmia.

Of the complications reported as occurring during these 56 pregnancies there were 3 forceps deliveries, 1 Porro operation, 1 retained placenta, 2 uncontrollable vomitings, in which labor was produced.

It is not perfectly certain, so far as I can see from a careful rereading of Dr. Noble's excellent and timely paper in 1896, that all the troubles reported were of necessity due to suspensio-uteri. In fact, it is not clear that they should not be charged against fixation of the uterus to the abdominal wall instead of to the operation we are considering, namely, "Kelly's operation," which is distinctly not fixation, but suspension of the uterus.

Indeed, it is perfectly certain that many of the cases reported in the paper on suspensio-uteri just referred to were actually fixations and not suspensions. I would also suggest that it is quite possible that some of the above complications in the 56 pregnancies reported, following 1016 operations, might have occurred in that many cases if no operation whatever had been performed for the relief of the existing retroversion of the uterus and the co-existing pelvic conditions.

In Dr. Noble's collection of foreign cases there were 175 pregnancies. He does not state, however, the number of operations performed, as the table is headed "Table of Labors Following Ventrofixation of the Uterus Collected from Foreign Sources." The consideration of these figures evidently would be out of place in a paper on ventrosuspension.

A curious fact seems to have been established by the statistics quoted, to wit: that pregnancy, the great bugbear of suspensio-uteri, occurs so infrequently that one could almost

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regard it in the nature of cause and effect. Thus, following the 310 operations reported by Penrose we have only 20 cases of pregnancy; after Kelly's operation only 14; after 733 operations collected in Washington, by Stone, only 49; after my own operations only 2, and after Dr. Noble's collected cases, amounting to 1016 in this country, only 56.

In Dr. Suddarth's case, where great trouble was anticipated partly on account of these broadcast statements of probable difficulty and the need of obstetric surgery, no trouble whatever occurred and the woman was quietly delivered on her left side without any instrumental aid. Dr. Bowen recently had a similar case.

Dr. L. H. Dunning has employed a method of suspending the uterus for four years with good results. Eight of his patients, so far as he knows, have been delivered at full term without any complications. The suspension is made just opposite to the insertion of the Fallopian tube. He has employed this method in 165 cases, and at last accounts there were 8 pregnancies without any complications. Dr. F. B. Dorsey for more than ten years has been employing a method similar to Dr. Dunning. Seventeen pregnancies followed, and only 2 were delivered by instruments, not because of any malattachment, but because of a disproportion existing between the maternal pelvis and the child's head. He agrees with Dunning that the Alexander operation, or any of the operations thus far devised, does not give the results attained from anterior suspension of the uterus. Dr. Henry D. Fry has done ventrosuspension in about 150 cases, and has attended labor in 15 cases after the operation was done. In not one of these was there any trouble during the pregnancy, nor difficulty in labor requiring any artificial means to terminate it. Dr. John C. Applegate has not seen any bad results follow suspension, provided the sutures are placed on the anterior surface of the uterus.

Perhaps I have said enough, Mr. President, to indicate my preference out of the great number of operations devised

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for the surgical relief of retrodisplacements of the uterus, and my unwillingness to believe all the terrible prognostications of evil which we so frequently hear of the ill effects of suspensio-uteri on pregnancy in labor.

When the retrodisplaced or prolapsed uterus is *suspended*, not fixed according to the technique of the author of the operation, it appears to me to be the best operation yet devised for the great majority of women suffering with this displacement, irrespective of the fact that they *may* subsequently become pregnant.

DISCUSSION.

DR. J. WHITRIDGE WILLIAMS.—I hope the members of the Association will not feel that I am trying to monopolize the discussion this evening, but the question brought before us is one in which I have had considerable experience, which, I am sorry to say, has not been identical with that of Dr. Johnson.

During the past ten years, I think, I can safely say that between twenty-five to thirty women have been delivered in my service at the Johns Hopkins Hospital, after the uterus had been suspended or fixed by various operative procedures. In all but two cases the previous operation exerted little or no effect upon the course of labor, but in these two it gave rise to serious disturbances.

The first case was a multiparous colored woman who had been operated upon at another hospital, and was completely ignorant of what had been done to her. She came under my care at the Johns Hopkins Hospital in the latter months of pregnancy complaining of intense pain in the lower abdomen. On inspection, a dark cicatrix was found in the midline just above the symphysis, which seemed to be retracted by traction exerted from within the abdomen. On examination it was found that the cervix was displaced upward and backward and that the anterior and lower part of the uterus was firmly fixed to the abdominal wall. In the last few weeks of pregnancy she suffered so intensely that I was tempted to open her abdomen for the purpose of releasing the adhesions. This was not done, however, and she fell into labor spontaneously. After some twenty-four hours of pains, vaginal examination showed that the cervical canal was obliterated, the external os 4 cm. in diameter and displaced upward and backward, so that it lay just above the level of the promontory of the sacrum. The anterior wall of the uterus was markedly thickened, so that the enlargement of

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the organ appeared to have occurred almost entirely at the expense of its posterior wall. In view of the abnormal situation of the cervix it was apparent that its further dilatation could not be effected by the unaided efforts of nature, and accordingly the question arose whether Cæsarean section was necessary or whether the patient might be delivered by the vagina. In view of the fact that she had already borne children and that the resistance of the cervix had therefore been considerably lessened, I determined to attempt its manual dilatation. This was effected with considerable difficulty on account of the flexed position in which it was necessary to maintain the hand while doing so. After the dilatation, internal podalic version was performed and the child extracted without great difficulty. The woman made an uneventful recovery, except that she continued to complain of pain in the abdominal scar, which was so severe as to prevent her walking, much less doing any kind of work. I therefore opened the abdomen some weeks after labor, and found the fundus of the uterus firmly adherent to the anterior abdominal wall and held in position by two silkworm-gut sutures, which passed through the muscles and fascia. After removing these, I separated the adhesions and freed the uterus. The patient recovered promptly and was soon able to return to her work.

The second case was treated by Dr. F. W. Lynch, of the University of Chicago, who at the time was Resident Obstetrician at the Johns Hopkins Hospital, and I saw the patient only after delivery. In this instance he had to do with a multiparous woman, whose uterus had been suspended in the first month of pregnancy, but before she was aware of her condition, by one of Dr. Kelly's older and most trusted assistants. Throughout pregnancy the patient complained of considerable abdominal pain, but only came into Dr. Lynch's hands when labor was well advanced. At that time the cervix was displaced so far above the promontory of the sacrum that he felt that it was impossible to deliver her by the vagina, and therefore performed a Cæsarean section. Upon opening the abdomen the uterus was found to be firmly adherent to the anterior abdominal wall and the posterior wall of the uterus almost as thin as a sheet of paper. The patient was delivered of twins, but died some days later of an infection which had started before she entered the hospital. This case, together with twenty-one more or less similar ones recorded in the literature, was reported by Dr. Lynch in the *Monatsschrift f. Geb. u. Gyn.*, 1904, Bd. xix. pp. 521–38.

Up to the time of the occurrence of this case, I did not believe that ventrosuspension could give rise to serious dystocia, as I felt that in all the instances in which such an accident had been reported the uterus had not been suspended, but had been fixed to the anterior abdominal wall; and that while such cases clearly illustrated the dangers of fixation of the uterus they had no bear-

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ing upon the question of suspension. In this instance, however, the operation was performed by a man who had been trained by Dr. Kelly, and therefore well acquainted with the technique of the operation. Such being the case it was inevitable for us to feel that even when ventrosuspension had been done in the most approved manner, it might nevertheless be followed by an unintentional fixation of the uterus.

This case made a deep impression upon Dr. Kelly and caused everyone who was working along gynecological lines in Baltimore to hesitate in the performance of ventrosuspension and to look for some suitable substitute for it. For some months Dr. Kelly, his assistants, and myself gave up ventrosuspension and tested various of the numerous substitutes which had been suggested for it, but none of them proved entirely satisfactory; so that of late we have returned to ventrosuspension, though it must be confessed that we resort to it less frequently than formerly.

In connection with the subject of suspension of the uterus and its effect upon the course of labor, I might refer to a case which was operated upon by Dr. Kelly some years ago, and which later died after a Cæsarean section performed by Dr. Dickinson, of Brooklyn. In this instance the patient had been operated upon by Dr. Kelly before she married; several myomata were enucleated from the uterus, which was finally suspended from the anterior abdominal wall in the typical manner. As a result, however, of the traumatism resulting from the removal of the myomata, broad adhesions occurred between the uterus and the anterior abdominal wall, which so altered the position of the cervix that when the woman fell into labor Dr. Dickinson felt that delivery could be effected only by Cæsarean section, which unfortunately terminated fatally.

Of course it may be objected that in all of these cases we had to deal with fixation and not with suspension of the uterus. This was undoubtedly true in the first case, but in the other two the fixation was unintentional, and occurred after suspension had been attempted. Accordingly, I feel that an ideal suspension will in all probability, have but little if any effect upon the course of labor, but at the same time it is impossible to foretell whether our results will be ideal in a given case, as some slight cause may seem to convert the harmless suspension into a dangerous fixation. This being the case, it behoves us to be on the lookout for a perfectly harmless and satisfactory method of treating retrodisplacements in women during the child-bearing period.

Dr. I. S. Stone, of Washington, D. C.—It seems to me a perfectly natural thing to have Cæsarean sections, and a great deal of dystocia and trouble after "ventrofixation," and I do not know of anything that favors troubles of this kind more than the Kelly method of performing the operation. We all know that

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Dr. Kelly suspends the uterus from the posterior surface below the fundus. We have an abdominal wall, with supposed intra-abdominal pressure, and where an incision is made we are supposed to attach the uterus in such a way as to suspend it. When the uterus is suspended or fixed from the fundus, or a little anterior to it, what will happen if pregnancy takes place in that uterus? It gives an immense surface for expansion in pregnancy. If we suspend the uterus at this point (referring to diagram), as recommended by Dr. Kelly, while the patient is lying down, it is all right. But what happens when she stands in the erect position? The intra-abdominal pressure pushes the cervix forward just as much as if suspension were done from the fundus or in front. I can see no way to prevent it if a patient stands erect, with the weight of the intestines pushing the uterus forward upon the bladder and pubes. In case pregnancy should occur you have less room for expansion after that operation than if you made fixation at this point (indicating), or a little farther forward.

Since reading a paper in Washington, to which Dr. Johnson referred, I have been doing quite a number of operations by the Gilliam method, and I want some of the members to give us their experience with it. The idea of the Gilliam operation is to give two points of suspension. Of course, a great many will say there will be difficulties connected with this method; that there will be such possibilities as the intestine getting through in some way, between the suspensory ligaments, but I do not think any such case has been reported. If there has, I have not heard of it. No case of intestinal obstruction has occurred from the Gilliam operation, so far as I know.

There is one point to which I wish to refer. The round ligament on each side shows a good point in the Gilliam operation over suspension, in that the uterus is held up on either side. Many operators, in doing the Alexander operation, pull the attenuated ligament up from the outside; they pull it out two or three inches, secure it, and it stretches out again, so that the work has to be done over possibly because of posterior uterine adhesions. In the Gilliam operation you use the better part of the ligament, and I maintain that the ligament can never become attenuated and stretched out in the manner it is when the Alexander operation is done. Of course, atrophc changes may take place near a portion of the ligament, which is passed through the rectus muscle into the fascia, because the blood supply is interfered with; but suspension from the ligament remaining is just as secure as from the Kelly operation.

Dr. Rufus B. Hall, of Cincinnati, Ohio.—I have been very much interested in the paper of Dr. Johnson; also in the discussion, and I am not surprised at the statistics given by the essayist. But it is that one case that goes wrong that concerns the operator. If there is danger of trouble that threatens the

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patient's life after this operation it should be eliminated if the same results can be obtained without that danger. I know in our locality about Cincinnati, there have been several cases of complications attending labor from the various operations of anterior fixation of the uterus, and there have been some deaths from that cause. I will not say anything about the suspension operation of Kelly, because the operations I have performed were made before Kelly's operation; so that I will not plead guilty to fixation of the uterus to the anterior abdominal wall even by the Kelly method. I had my trouble before that; that is, stitching the uterus to the anterior abdominal wall by one or two or more stitches, as practised before Kelly's time, brought trouble. In one of my patients the uterus was fixed something after the suggestion made by the last speaker to the anterior abdominal wall a little farther in front, leaving a space between the fixation and the bladder through which a coil of ileum slipped. The patient had an incomplete intestinal obstruction, from which she recovered by careful management, and rendering the bowel contents liquid for several days. Finally, I had to open her abdomen and liberate this adherent coil of bowel, which saved her life. Another woman operated upon in a very similar manner became pregnant, and at about three and a half months of gestation she had a calamity of some kind, was suddenly sent to the City Hospital, and the doctor that operated on her found a coil of bowel incarcerated and gangrenous, and she lost her life. I made the first operation on that patient, and I would have made the second if I could have been secured in a hurry at the time. These two patients are to my credit for that operation. Another patient upon whom I performed the operation has been pregnant three times, and has aborted at the fifth and sixth months. She is very anxious to have a child, and not anxious to have another miscarriage, and therefore avoids conception as far as she can. She has had her uterus fixed to the anterior abdominal wall. I make a distinction here, in justice to the suspension operation, because I believe it is a better method.

There have been cases reported like those cited by Dr. Williams, where an accident has followed the operation, and probably there will be other cases. But I believe there is a substitute which is a better operation. Of all the various procedures suggested to me the operation of suspending the uterus by the round ligaments after Gilliam, as mentioned by Dr. Stone, is the better one of the last two suggested by the essayist. In the first place, there is no sense of pulling on the uterus; it does not bring the uterus so far forward; it leaves a space two inches from the fundus away from the abdominal wall, which is a consideration for the patient. In many of these cases fixation of the uterus to the abdominal wall has the sensation of something dragging on the anterior abdominal wall. The round ligament is not so sen-

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sitive as the uterus, and these patients do not complain of a pulling or dragging sensation on the abdominal wall. In those patients who have the uterus fixed, there is no difficulty in pulling the ligament, so that it lies entirely against the abdominal wall. The operator can see this part of the ligament coming from the internal ring, pull it up so that it lies flat against the abdominal wall, and there is no possibility of omentum slipping through. If it is pulled up tight at the outer end, there is no possibility of strangulation, the uterus can be kept forward, and the woman bear children. I have had five women who have borne children without discomfort, and if there is any kind of fixation operation to be made it is the best one. There may be other methods that are better in many cases, and one of them is some shortening of the round ligaments inside of the abdomen by doubling them over themselves.

Dr. J. Wesley Bovee, of Washington, D. C.—This discussion takes in a wide field when we speak of retrodisplacements of the uterus. Any operation which carries with it fastening of the uterus to the abdominal wall in front is erroneous in principle. As a good many have said, it is the substitution of one pathological condition for another. I believe that we should treat displacements of the uterus on the same principle as a sailor would treat the injuries to the guy-ropes or stays that support the mast of a ship. He does not run a stay in some other direction to remedy any fault on the part of the stays originally placed in the vessel; he supports or repairs them if they are faulty. If one breaks he must use some extra rope in the same direction. I believe the proper treatment of retrodisplacements is to correct errors in the guy-ropes of the uterus, namely, the ligaments. If we have a uterus the cervix of which is well forward, there is not any use in trying to fasten the fundus forward; we must have the cervix back, and the only way to satisfactorily hold the cervix back is to shorten the posterior stays of the uterus, which are the uterosacral ligaments. In some cases the anterior wall may be too short or attached too far toward the tip of the cervix, and this can be remedied by severing the anterior vaginal wall, so as to make the leverage greater on the part of the uterosacral ligaments and less on that of the uterovesicles. In addition to this, many times where the round ligaments are much slackened it is advisable to shorten those, that is, to take the strain off of the tissues already sutured. This does not furnish any new pathological condition, and therefore it is to me the most logical procedure of treatment of displacements of the uterus. I have done a great many suspension operations, and I have had many failures, so far as displacement is concerned. In those cases I have seen delivered after, there was apparently a very good condition and a very good position of the uterus. In one case I did ventrosuspension during pregnancy, and the woman aborted two months later.

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The fœtus continued to develop apparently up to the time of the operation. I am opposed to any operation of ventrosuspension or ventrofixation of the uterus in a child-bearing woman, as it is absolutely unsurgical in principle.

Dr. Robert S. Hill, Montgomery, Ala.—I think it is well that so important a subject as uterine retrodisplacement should be discussed in part, or as a whole, by every gathering of gynecologists and surgeons, until some uniform plan of treatment is adopted. The mere fact that so many operations have been proposed, that so many procedures are being daily resorted to, for the restoration of retrodisplaced uteri to, and maintenance in, their normal position, emphasizes more forcibly than words that there is no one method upon which we may rely with absolute confidence to accomplish our purpose in every case. I cannot say whether human ingenuity will ever devise means, universally acceptable to the profession, to meet the indications presented in retrodisplacement of the uterus. But I do assert we can hardly expect to attain this end from any other than an intelligent discussion of the subject. It should not be enough for us to be told that because Dr. so and so, an eminent member of our profession, does such and such an operation, therefore, that is the operation indicated. If we are to keep pace with the progress of the age, we must turn our backs, as time goes on, more to the day of empiricism. We must demand to view every operation from the standpoint of the principle which it proposes to subserve. Every operation, every suggestion, must rest upon a foundation of imperishable principle, or else it will go its way to the limbo prepared for the child-like fancies of untaught minds. It seems to me the principles that should guide our efforts to correct a misplacement of the uterus consist in the removal of the cause, if still existing, and a restoration of the normal supports of the organ, which are, in the main, its ligaments. As to the removal of the cause, we should be guided by the rules involved in the treatment of the different conditions that act as etiological factors. While we cannot discuss these at this time, yet, I wish to digress long enough to emphasize the importance of paying attention to the general systemic condition of our patients, a thing we too frequently neglect. We can hardly hope to restore the strength of a part of the system without restoring the strength of the system as a whole. In a case of uncomplicated retroflexion of the uterus—what I mean by uncomplicated is one in which there exists no other pathological condition, except probably endometritis, that calls for surgical interference—I say, in such a case, the round ligaments have become elongated, allowing the fundus of the organ to fall backward in the hollow of the sacrum. Here it seems to me the indication is to shorten these ligaments, and I believe this can be best accomplished by Alexander's operation or some of its modifi-

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cations. It is certainly attended with as little risk as any other operation on these ligaments or for this condition. I have never failed to find the ligaments nor have I ever had a hernia as a sequel. I do not lay open the inguinal canals unless, from the smallness of the ligaments, I fear they will break in pulling them out. I see no other good purpose that can be subserved by opening the canals. I do not believe in dilating the internal rings for the purpose of dealing with intraperitoneal complications. If there is a demand or indication for opening the abdominal cavity, let us make a median incision and after dealing with the complications shorten the round ligaments intraperitoneally. Of the methods of doing the latter I prefer folding each ligament upon itself.

In a case of uterine retroversion not only are the round ligaments elongated, allowing the fundus to fall backward, but the uterosacral ligaments are stretched, permitting the cervix to sag forward and downward. It seems to me that any operation for this condition that is limited to the shortening of either one or the other pair of ligaments stops short of meeting the indications. If we simply shorten the round ligaments the fundus of the uterus will be drawn in its natural position, but the organ as a whole will not be restored to its normal relations. In short the axis of the uterus will be changed in such a way as to throw upon the round ligaments the duty of sustaining the organ. This is a duty which nature did not intend that they should discharge, and which they are illy prepared to discharge. Their function is to restrain the backward movement of the fundus of the uterus. If we can shorten the uterosacral ligaments as easily as we can round ligaments by Alexander's operation, and at the same time, which seems probable by Bovée's method, then, to my mind, we have in the combined efforts—in the two operations—a technique which meets the indications presented in uncomplicated cases of uterine retroversion. When retroversion is complicated by some condition that requires the abdominal cavity to be opened, the operation of ventrosuspension should be considered. If the uterine appendages must be removed, or the woman has passed the menapause, I know of no objection to this operation, except the very small danger of intestinal obstruction, caused by the wrapping of the bowel round the suspending band.

When future pregnancy is a probability, I believe, as a rule, it is better to undertake to hold the uterus in its normal position by intraperitoneal shortening of the round and uterosacral ligaments. When I recall that in the discharge of the function of pregnancy the uterus rises to or above the umbilicus, I cannot bring myself to the opinion that its attachment to the anterior abdominal wall by a false band is free from danger. It seems to me that in the growth of the pregnant organ this band must

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either stretch beyond recovery, break, or else it will interfere with the proper discharge of the uterine function.

Dr. Guy Le Roy Hunner, of Baltimore, Md.—I agree with the last speaker in saying that at every session of this Association we should have a discussion on this very important subject, but I am not very sanguine that we shall ever agree upon any one plan of treatment. In fact, we have so many varieties of conditions in what we speak of as retroversion of the uterus that, it seems to me, it would be folly to use any one plan of treatment. In the unmarried woman, in a woman who has not borne children, we ordinarily have the one condition of retroversion, or retroversion and retroflexion without a relaxation of the outlet. For such cases the Alexander operation meets every requirement, simply a bringing forward of the uterus against the anterior wall. In such a case as this, when the uterus is once brought forward, the erect posture helps to keep it forward.

We have an entirely different condition in those women who have borne children, in whom we have retroversioflexio-uteri, together with descensus of the organ or displacement downward. For such cases it has been my practice and teaching to shorten the uterosacral ligaments, or, rather, to repair the pelvic floor, and then shorten the uterosacral ligaments, and treat the condition of the fundus according to circumstances. It is folly for us to speak of adhering to any one operation. We ought to study each case carefully and deal with it according to the conditions present. In the case of a woman in the child-bearing period, who has retroversioreflexio-uteri, with descensus, I shorten the uterosacral ligaments to draw the cervix upward and backward toward its original position. That throws the fundus forward, and it needs very little else to keep it in that forward position.

Dr. Hill.—If it should need that "little else," what would you do for it?

Dr. Hunner.—I think that any round-ligament operation will do for keeping the uterus forward in those cases, where it is of the normal size, after you have used the uterosacral ligaments. I have abandoned the Webster operation in favor of the Alexander done through the median incision. After shortening the uterosacral ligaments I separate the skin and subcutaneous fascia from the abdominal muscles at this point (indicating), I split the fibers of the external oblique muscle just over the internal ring, and can find the round ligament very easily in that place. I bring it through the split external oblique and fasten it in front. This is somewhat after the operation suggested by Dr. George H. Noble, of Atlanta, with the exception that he makes a new opening through the muscle here (indicating). I do not see the advantage of an artificial opening in shortening the round ligament and bringing it out on the abdominal fascia. On the other hand, if we have a case with a large, soggy uterus, greatly

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increased in weight, we must take what little risk there is in ventral suspension and be sure to give the patient a good result. That is what the patient wants. She wants to get rid of her symptoms. I make it a practice, in these cases with large, heavy uteri, of not depending on any round-ligament operation, but, in addition to the uterosacral-ligament operation, I depend upon the ventrosuspension.

I think Dr. Stone's points are well taken, that ventrosuspension should not be made back of the median line of the uterus, and in my practice I take the first suture slightly anterior to the midpoint of the fundus and the second one anterior to that.

Another point not brought out, which I think is very important, is to leave plenty of space between the symphysis and the uterus, so that bowel may slip around in front of the uterus over the bladder and back again without any danger of incarceration. I have seen many operations performed where the uterus was fastened close to the symphysis, and it has seemed to me that this method invites intestinal strangulation.

Dr. William Edward McGuire, of Richmond, Va.—I agree with very much of what has been said by Dr. Hunner in regard to the treatment of these cases. I do not think we can adopt any one operation in the treatment of posterior displacements of the uterus. I have had considerable experience with the various methods, and in the last twenty-five or thirty cases I have been doing the Gilliam operation. I have been giving it a trial, as I have tried all of the rest of these operations. It is a well-known fact that, if, in a case of retroversion, and the uterus is not too soft, you lift the uterus to its normal level in the pelvis, and keep the cervix within the hollow of the sacrum, the fundus will stay in position. Of course, that is not the case in retroflexion. I think Dr. Bovée's idea of shortening the uterosacral ligaments in these cases is important; but I do not believe that it will hold good in cases of retroflexion, where the uterus is soft and boggy. I regard this as one of the most difficult subjects to decide as to what operation to do in cases that present themselves. I have done ventrosuspension oftener than the other operations. I have never had any cases of trouble reported. I have myself delivered eight women upon whom I performed this operation. We cannot blame the operation as often as we might think. In the first place it is a simple operation. It is easily done, and it is frequently done by men without the slightest experience, and they have no idea of the dangers that may ensue from the improper fastening of the uterus to the abdominal wall. It is a common thing in the City of Richmond for young practitioners to do this operation—men who have only been engaged in the practice of medicine for possibly a year or so. As a result, we come across cases of trouble during parturition where such an operation has been done by a man who does not understand the principles of

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the operation. I have never had any trouble from this operation, following parturition.

As to shortening of the round ligaments intraperitoneally, that is, of course, an ideal operation. It fulfils all the indications. In cases with marked descensus of the uterus, which follows after parturition, these operations of intraperitoneal shortening of the round ligament do not to my mind lift the uterus sufficiently high in the pelvis. They do not lift it to its normal level. Therefore, if we can supplement any such operation by some operation that will lift the uterus up, it would be an ideal method. I believe Dr. Dudley performs an operation with this idea in view, and I trust he will give us his experience in regard to it. I have never seen any cases of intestinal obstruction occur from suspending the uterus in the way I have mentioned. I have not used Ferguson's modification of the Gilliam operation sufficiently long to give my experience in regard to it. Only last year did I do this operation.

No more important subject can come before the Association than to determine what is the right course to pursue in these cases. I have done at least eight or ten of these operations, and have given all of the methods a trial. I do not adopt any one method. I think they all have some good points, but still no one of them is perfectly satisfactory.

Dr. J. W. Long, of Greensboro, N. C.—I did not hear the paper read, but only a little of the discussion, and if I understand the subject rightly, the members have been discussing the best method of treating retrodisplacements of the uterus. I will say that in about twenty cases of suspensio-uteri by the Kelly method I have had two pregnancies, and the women were delivered without any trouble.

Dr. A. Palmer Dudley, of New York City.—I just want to say that I agree with what Dr. Hunner has just said, namely, that I do not think that we will ever arrive at any one uniform method of operation for retrodisplacement of the uterus until we thoroughly understand the dynamics of the woman's abdominal cavity in health, in pregnancy and after delivery, because they are entirely changed, and therefore we must be prepared to do any form of operation that is indicated in the individual case we have to work on.

I would like to criticise Dr. Bovée's method, not from a personal standpoint, but from the point of view of a soft uterus, and retroversion. In these cases of retroversion and retroflexion, he must do more than shorten the uterosacral ligaments. The uterus, when in proper position, may be represented as a little below a line drawn half-way across the abdomen from navel to pubes. If you have it in this position and want to carry it to that position (indicating on blackboard), there is no one operation that will fulfil all three conditions—not one. But the object is to re-

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store the uterus to an angle of nearly 45 degrees. Now, to fasten the uterus to the rectus muscle is, in my judgment, absolutely wrong. I would no more think of fastening the uterus to the rectus muscle than to do a hysterectomy upon a woman with a healthy uterus. Any method of suspension should allow more or less mobility of the uterus. We do not want to resort to any method of suspension that is going to imprison the uterus in any way, and there are so many methods that, as Dr. Johnson has said, we hardly know which to choose.

The operation of suspending the uterus with the round ligaments at about this point (indicating) is the Gilliam operation. In order to draw the uterus up in its normal position in that operation the pelvic cavity is divided into two halves. It takes away from the space allowed to the child as it develops. That point is well taught in many cases. As to this method of operating, one of the speakers was right in saying that it was not useful or practical for certain cases, because it does not lift the uterus high enough. The round ligament is twisted and sewed together, and the front surface of the uterus, when drawn up, leaves the fundus free, and any adhesions can take place. That is what you get by another method of operating which will not fix the uterus, but which will allow perfect mobility and not endanger the woman from any buried stitch. It is done largely before closing the abdomen. (Here Dr. Dudley went to the blackboard and demonstrated the steps of the operation he performs in these cases.) If that is the incision (indicating) and this the peritoneum (indicating), this is sewed up with catgut, and it comes down to the uterus. You can draw the peritoneum down and fasten it by a stitch to the top of the uterus. Catgut sutures are passed into the fundus and up each side of the peritoneum, and out here (indicating), and then tied. These sutures are left in about sixteen days. The uterus is not fastened to any muscle, to the fascia, to the linea alba, or anything except the peritoneum, and you know how movable the anterior abdominal wall is. I have made that operation a great many times, and have attended many patients who have been delivered since it was done. I have watched them carefully myself during delivery. And what happens to them? The uterus is allowed to move. As the uterus moves, the ligament moves with it, the uterus takes its proper position, and has its artificial ligament moving with it, and as it moves up it straightens when the woman is delivered. There is no dystocia whatever, and the ligament returns to its proper place without trouble.

DR. HERMAN J. BOLDT, of New York City.—I have one question to ask, namely, as to the effect of ventrosuspension on future pregnancies. It has been shown by the narration of cases by different gentlemen that we do have dystocia resulting from this operation, and I simply ask this question: Can anyone

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guarantee that an intended ventrosuspension may not become a ventrofixation? That does occur sometimes, and we have dystocia resulting during labor, and, therefore, I believe that the operation is not one that is indicated in the child-bearing woman.

DR. JOHNSON (closing).—I will not detain you very long. While there has been a good deal of discussion, very few of the speakers have really discussed my paper, which was the effect of ventrosuspension on pregnancy and labor. We ought not to suggest a remedy that is worse than the disease. It is a horrible thing for a woman to die from an operation for the relief of a condition that has no mortality. I do not understand that most of the speakers always do the Alexander operation in these cases, because we all know that a great many of them are not simple retrodisplacements of the uterus. Quite a majority of them are associated with other conditions which have to be relieved at the same time, and which can only be relieved by some operation that opens the abdomen. It is absolutely impossible to pull the uterus up by the round ligaments, when it is made heavy by a tumor, or is bound down by adhesions or associated with pus tubes. But I do not want to discuss this phase of the subject, because it was not embraced in my paper.

Most of the gentlemen, who referred to my paper at all, reported that they had had no trouble whatever with their cases of ventrosuspension, not ventrofixation, in which pregnancy and labor occurred afterward, with the exception of Drs. Stone, Hall, and Williams. Dr. Williams reported cases in which trouble had occurred possibly from ventrosuspension, but most likely from ventrofixation. I am very much opposed to fixing the uterus in this position, by substituting one bad position for another bad position. If we can suspend the uterus so that it will not interfere with pregnancy and labor, and not tangle up the intestines so as to bring about intestinal obstruction, it is what we should aim to accomplish.

The impression has been growing on me, for several years, that perhaps we were all wrong in attributing so many symptoms to the mere backward displacement of the uterus, and neglecting to treat the associated conditions, which after all may cause most of the trouble. I have seen many cases of simple uncomplicated retroversion without symptoms. Pathological pelvic conditions outside of the uterus may be relievable by mechanical or manipulative treatment leading to their attenuation or absorption.

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TYPHOID FEVER AND APPENDICITIS.

By John Chadwick Oliver, M.D.,
Cincinnati.

The purpose of this paper is to again call attention to the facts that these two diseases may be mistaken the one for the other; that they may co-exist in the same patient; and that one of these diseases may precede the other by but a short period of time.

When these two diseases follow what may be rightfully regarded as their typical courses the question of differentiation does not arise, because there is little or no similarity in their mode of onset or in the manifestations of the diseases; but it occasionally happens that typhoid fever has an abrupt invasion, and, on the other hand, an attack of appendicitis may have an insidious onset. Under such circumstances a differential diagnosis may be very difficult or even impossible. The report of the following case illustrates the fact that an unusual case of typhoid fever may be diagnosed as being one of appendicitis.

Case I.—The patient was a young colored girl, aged thirteen years, who was perfectly well four days prior to the onset of this attack; this statement was made by the patient and confirmed by her mother. While returning from an errand to a grocery store, three days before entering the hospital, the patient was suddenly seized with a severe pain in the abdomen, the point of greatest intensity being, according to her statement, in the region of the umbilicus. The pain was followed in a short time by vomiting. The pain and

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vomiting continued for three days—*i. e.*, until she was admitted to the hospital. Her bowels moved freely, without the employment of a cathartic, upon the third day of her illness. She had a slight epistaxis the same day—this had occurred once previously.

The patient was well nourished when she entered the hospital. There was nothing to indicate that she had been ill for a longer period than that stated by her and her mother. Her temperature when admitted to the hospital was 104.4°, her pulse was 124, and her respirations were 28 and of the thoracic type. She complained of very great pain in the abdomen. The belly wall was very rigid and retracted. Tenderness was very pronounced in the region of the navel and at McBurney's point. Palpation of the abdomen was unsatisfactory because of the rigidity of the abdominal muscles, but dulness was elicited by percussion in the right iliac fossa.

One-sixth of a grain of morphine was given hypodermically. A half-hour later the abdominal muscles were so far relaxed as to enable us to outline a distinct mass midway between the umbilicus and the right anterior superior spine of the ilium. This mass, lying in a longitudinal direction, was apparently two inches long and nearly as broad. It was exquisitely tender.

After the patient had been in the hospital for one and one-half hours her temperature had risen to 105.2° and her pulse to 132 per minute. The other symptoms remained unchanged. The patient was prepared for an immediate operation.

Incision revealed the fact that the mass referred to above was the lowest part of the ileum and the head of the colon. These structures were so very much thickened and indurated as to give one a sensation such as is conveyed by handling a sausage—the parts felt solid instead of hollow. The appendix was isolated and found to be normal. The mesenteric glands were markedly enlarged and infiltrated. The

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appendix was not removed. The patient died during the evening of the day of operation.

The necropsy showed "characteristic lesions of typhoid fever, especially in the lower three feet of the ileum, and very marked hyperplasia around the ileocæcal junction—even after death the hyperplastic condition felt like a tumor mass. The vermiform appendix was found to be normal."

The histological examination, conducted by Dr. J. E. Greiwe, showed typhoid ulceration of the intestine, adenitis of the mesenteric glands, with acute fatty degeneration of the liver. I find no record concerning the condition of the spleen.

The history as given above is taken directly from that written by my house surgeon, Dr. Woodward. The acuteness of the onset, the vomiting, the muscular rigidity, the tumor, and the pain and tenderness justified the diagnosis of acute appendicitis. It is true that an examination of the blood might have been of service in making a correct diagnosis, but one may well doubt whether a positive Widal reaction would have been deemed of sufficient importance to have outweighed the other symptoms. In the light of later developments more importance might have been attached to the epistaxis.

This was the first case in which I had ever encountered a palpable tumor in the right iliac fossa due to typhoid infiltration of the intestine, but I have met with the same condition twice since. I have knowledge of a case in which this condition was mistaken for a malignant growth and the infiltrated portion of the bowel excised. It is important to emphasize the possibility of encountering this condition in typhoid fever, so that one may be on his guard against possible mistakes in pathological diagnosis.

It is by no means certain that this patient would have recovered had no exploratory operation been done, but it is at once apparent that the operation did add to the burdens

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the patient was compelled to carry and may have contributed to a considerable extent to the fatal result.

The following case shows the possibility of the opposite mistake—that of diagnosing typhoid fever in a case of appendicitis—being made.

CASE II.—The patient was a boy, aged thirteen years, who returned from a visit to the country complaining of malaise, fever, and general prostration. The physician in charge, a very competent practitioner, suspected typhoid fever and had his opinion confirmed by two positive Widal tests. What were taken to be rose spots subsequently appeared, but no enlargement of the spleen could ever be made out. The fever continued for five or six weeks without remission; so his attending physician began to have doubts as to the correctness of his diagnosis. The fever continued and the liver seemed to be enlarged, especially in an upward direction. A distinct bulging in the lower costal region on the right side soon became manifest, and aspiration revealed pus. A marked leukocytosis (28,000) was present previous to puncture. A rib was excised and the abscess was freely drained.

The history of this case suggests a primary appendicitis with a secondary subphrenic abscess, and yet the Widal test was positive on two separate occasions and in the hands of two different observers.

It is quite possible that typhoid fever and appendicitis may co-exist in the same patient. A typhoid ulcer in the appendix may give rise to symptoms of appendicitis which may mask the existence of the characteristic typhoid indications. Dr. J. B. Murphy[1] says: "Where the temperature alone precedes the pain for a day or even two or three, then I am fearful that it is typhoid fever with a typhoid ulcer in the appendix. I have seen 7 cases of this class: the first 3 were operated and typhoid ulcers were found in the appendix;

[1] American Journal of the Medical Sciences, August, 1904, p. 191.

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the last 4 were not operated; all went through classic typhoid courses after the appendicial manifestations, and all 7 cases recovered."

The following report illustrates this class of cases, although the history seems to indicate that there was a primary appendicitis followed by a typhoid fever with a typhoid ulceration of the appendix.

Case III.—Mr. C., aged twenty-two years, residing in Camargo, Illinois, one of Dr. I. W. Hall's patients. I am indebted to Dr. Hall for the earlier history of the case.

The patient came to his office on the morning of April 4, 1904, complaining of pain in the stomach. He attributed his stomach trouble to the fact that he had been doing his own cooking. The doctor, being in a hurry to get away, prescribed without a very careful examination and advised him to return in a day or two if no improvement took place. He returned on April 6th, walking with his body stooped and complaining of soreness and cramping in the right side of his abdomen. He stated that after going home on the 4th he vomited and suffered very severe pains in the right lower half of his abdomen. The doctor examined him and found that he was very tender in the right iliac fossa and that there was a firm tumor in the region of the appendix; the tumor was immovable. This mass was somewhat tender on pressure and the examination produced some sharp pain by reason of pressure. The right rectus muscle was rigid. He would obtain some relief when he would draw up his right leg. The expression of his face was anxious. There was no elevation of temperature, but his pulse was 100. His bowels were not constipated. The patient was ordered to go home and remain in bed.

On the morning of April 7 the doctor was notified by telephone that the patient had vomited and suffered intensely most of the night. When Dr. Hall saw him at his home he found him in bed, lying upon his back with his knees drawn up. There was pain in the right iliac region, nausea, temper-

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ature 101°, pulse 100. The bowels were so distended that palpation of the tumor mass was unsatisfactory. There was distinct dulness in the right iliac fossa. The rectal examination revealed tumefaction on the right side. Pressure with the finger in this region was very painful.

Dr. Hall went back to see the patient in the evening and took Dr. W. A. Wiseman with him. They found that the bowels had moved freely several times in response to a dose of castor oil given that morning. His condition was about the same as in the morning except that his bowels were more distended. His temperature had remained at 101°, but his pulse had risen to 120. The patient was advised to have a surgeon called in and Dr. Hall telegraphed me on the evening of April 7th, but unfortunately my engagements were such that I could not leave until the following afternoon.

Dr. Hall saw the patient again on the morning of the 8th, and found that he had had a good night, had no nausea, was still very tympanitic, but that he could straighten his legs without much pain. His expression was better; his temperature was 100° and pulse 100. The tumor could be palpated, indicating that the distention was less than it had been.

He was reported as being better on the 9th and free from pain. Dr. Hall saw him again on the 10th. He was feeling well, no pain, temperature and pulse normal, appetite good, tumor the same size and tender. The tympanites had disappeared. He continued to improve and came to Dr. Hall's office about the 15th, feeling well. There was no elevation of temperature; pulse was 100; the tumor was reduced some in size, still tender, but no tenderness elsewhere in the abdomen.

He reported to Dr. Hall at his office again on the 21st, feeling much better. His bowels were moving well and he was sleeping well. His pulse and temperature were normal. The tumor had almost disappeared, but he was still somewhat tender in the region of the tumefaction.

The doctor kept him on liquid diet until the 21st, when

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he was informed that he might then begin to take solid food. On May 3d he came into the doctor's office again. His face had a blanched appearance. His temperature was 100° and pulse 100. The tumor was a little larger and softer than it was on April 21st. His appetite was poor; his bowels were moving well; the region of the tumor was tender. The doctor advised him to come to Cincinnati with the idea of consulting me. The patient came by train, a distance of two hundred miles or more, and arrived at the Presbyterian Hospital on May 7th.

My examination of the patient made me suspicious of the diagnosis of appendicitis, and in order to rule out other conditions, I had a blood count and a Widal test made. The Widal test was negative and the blood count showed a marked diminution in the number of leukocytes. Several blood counts and Widal tests were made, but they all corresponded to the original one.

The patient was kept under observation until May 10th, at which time an exploration was made. The appendix was found coiled upon itself and bound up tightly to the head of the colon. The tumor mass referred to above proved to be a very greatly indurated and thickened lower end of the ileum. The mesenteric glands were enlarged and highly suggestive of typhoid fever. The appendix was removed and the abdomen closed without drainage.

Upon slitting up the appendix two ulcers were found in the mucous membrane, a round one near the tip of the organ and an oval one near the base, corresponding in appearance to ulcers of the solitary glands and Peyer's patches.

The subsequent history of the case is that of typical typhoid fever. The patient recovered and returned to his home on June 15th.

The bacteriological examination of the interior of the appendix revealed a pure culture of what was regarded as the typhoid bacilli taken from the distal ulcer. The proximal

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ulcer showed a mixed infection, but contained some pure colonies of staphylococci.

Attention has been called frequently to the possibility of mistaking the symptoms due to the perforation of a typhoid ulcer for those of a fulminant appendicitis. This mistake is most likely to occur in the cases of "walking" typhoid, because the previous history is likely to deceive one as to the time of onset of the disease. The report of the following case illustrates this point:

CASE IV.—A boy, aged about fourteen years, was brought into Christ Hospital in a moribund condition. He was pulseless; the extremities were cold and early dissolution seemed inevitable.

The history was that the patient up to four days previous had seemed slightly indisposed, but continued about his ordinary duties. The evening previous to his entrance to the hospital was characterized by a sudden exacerbation in his symptoms, with the development of pain in the right iliac region, fever, vomiting, etc. The patient was sent into the hospital with a diagnosis of acute appendicitis. He died about two hours after his admission to the hospital.

The necropsy revealed a perforation of the ileum, the result of a typhoid ulcer in that part.

These case reports call attention to several important points which merit our serious consideration.

Histological investigation of the appendix vermiformis leads one to believe that there is no good anatomical reason why typhoid ulceration of the glandular structure may not occur, and that if it does take place there is no reason why perforation of the ulcer may not ensue. The theoretical conclusion is borne out by practical observations on the operating and post-mortem tables. Harvey Cushing makes the statement that the appendix is the seat of perforation in 9.6 per cent. of all cases of perforation from typhoid fever. Finney gives 5 per cent. as the proper percentage of perforation of the appendix in typhoid fever. These figures apply only to

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cases of perforation. I know of no figures which will throw light upon the question as to what proportion of cases of typhoid fever have ulcers in the appendix. Dr. A. I. Carson, pathologist of the Cincinnati Hospital, has paid particular attention to this point, and he finds such ulcers of the appendix to be very unusual in the fatal cases of typhoid fever which come to post-mortem examination. One is justified in concluding that typhoid ulcers in the appendix are very rare, but that they may occur and add materially to the difficulty of differential diagnosis between the two diseases.

A second important point to be borne in mind is that the typhoid infiltration of the bowel may be so great as to form an appreciable tumor in the right iliac region. This induration may be quite easily confounded with the swelling in the region of an inflamed appendix.

This series of cases seems to indicate that the Widal test is of such doubtful value as to justify one in practically ignoring it in the class of cases under consideration. It was present in one case of appendicitis and absent in one of typhoid fever. In these 2 cases the blood count was more suggestive than the Widal test. In the case of appendicitis the leukocyte count was high (28,000) and the presence of pus was demonstrated by incision; in the case of typhoid fever there was a leukopenia and the lesions of typhoid fever were discovered.

I cannot agree with those surgeons who maintain that incision in these cases is practically without danger, because I am convinced that the exploration made in the first case reported materially shortened the life of the patient. She might possibly have died from the malignancy of the typhoid infection, but it would probably have occurred at a much later date.

In spite of the fact that exploration does add somewhat to the burdens of these patients, we ought by all means to resort to it when it becomes necessary to distinguish between a

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perforated typhoid ulcer and a fulminant attack of appendicitis, because either of these conditions presents an unfavorable prognosis when surgical measures are not employed. While recognizing the danger of an exploratory incision we must choose it as the less of two dangers under the conditions above depicted.

One may reasonably question the wisdom of operating in cases of "typhoid appendicitis"—*i. e.*, those cases in which typhoid ulcers are located in the appendix as well as elsewhere in the intestinal tract. Should one be so fortunate as to make the diagnosis of this condition he would probably be wise to refrain from operation because of the unsatisfactory general and local conditions. The small proportion of perforations would be a valid objection to advising operation in all of these cases. Symptoms of perforation of the appendix would, under these circumstances, probably closely approximate those of intestinal perforation and their presence would be an imperative call for intervention.

Dr. Levi Jay Hammond[1] has considered the influence of appendicitis upon a subsequent attack of typhoid fever. He arrives at the conclusion that a previous appendicitis predisposes to perforation by reason of the ileum and large intestine being bound down by old adhesions, this fixity preventing the necessary expansion of the bowel when it is the seat of marked ulceration. He refers to several cases in which the adhesions may have played the role ascribed to them. His conclusion is that "when a case of typhoid fever presents among its earliest symptoms pain to the right of the hypogastric region, with tenderness, nausea or vomiting, aching or discomfort in the groin, oftentimes extending down the leg, anorexia, and, last but not least, rigidity of the right rectus muscle, a relighting up of a pre-existing disease should be suspected, knowing as we now do that the right iliac fossa is not tender in typhoid fever; at least, not until

[1] Journal of the American Medical Association, April 16, 1904.

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after the seventh or eighth day, when the bacillus of Eberth is deposited in the glands of the intestine (Peyer's patches). Immediate laparotomy would seem the only wise course to pursue, removing not only the appendix, but thoroughly freeing the agglutinated coils of the ileum from its tied-down position, which must of necessity impair nutrition of the parts, and consequently diminish its structural resistance." It is exceedingly difficult to follow the writer's chain of reasoning by which he arrives at the conclusion or knowledge that the patient has typhoid fever. We can all see that the symptoms given above are indicative of appendicitis, but they are, according to the author's own statement, never present in typhoid fever before the seventh or eighth day. His statements should be pruned of all reference to typhoid fever and be construed to mean that an early operation is indicated in cases of appendicitis. It is probable, in view of the greater comparative prevalence of typhoid fever, that the influence of typhoid fever upon a subsequent attack of appendicitis would be a much more profitable question for discussion.

There are many correlated questions which might be discussed in this connection, but the limit of time forbids our entering upon their consideration. I have endeavored to confine my remarks to observations made from personal contact with cases of this class, and have therefore not drawn extensively upon the literature of the subject.

DISCUSSION.

DR. C. E. CALDWELL, of Cincinnati, Ohio.—I have been very much impressed with the value and timeliness of Dr. Oliver's paper, because it has been my experience, particularly in children, that there is some difficulty in differentiating typhoid fever from appendicitis. This is particularly the case where the appendicitis is subacute and with it we have associated some degree of delirium. I want to report one case that was very confusing, to me at least; it may not have been to those who had more experience.

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Last summer, being in charge of Dr. Dandridge's service at the Cincinnati Hospital, a patient came in with a history of vomiting the previous evening, with active delirium. The general appearance of the patient was strongly suggestive of typhoid fever. There was tenderness in the right iliac region in the neighborhood of McBurney's point, not particularly marked, but rather diffuse. The patient showed no symptoms of active or very acute appendicitis. A leukocyte count was made every day for several days, and there was an increasing leukocytosis which reached eventually 20,000. There was no marked induration, no swelling in the right iliac region, and in view of a very questionable condition of affairs I thought it better to suspend judgment, and as the patient was doing well, and there seemed to be no condition threatening at the seat of the appendix, the case was allowed to go on. After a period of two weeks the delirium was quite frequently so marked that the patient had to be strapped in bed, manacled on one or two occasions because he would jump out of bed during the night with his delirium; the temperature became normal in the morning, slightly elevated in the evening. The delirium did not disappear. There was a large tumor in the right iliac region, perceptible, and I operated on him and found an abscess, the appendix having sloughed at the cæcum, and the cæcal opening fortunately by plastic inflammation had closed, and the patient was probably saved thereby from the consequence of an early sloughing appendix. I have no doubt in this case that the delirium was due to the local condition of absorption in this sloughing appendix. This impressed me as an interesting case, as I have not known of another instance where the delirium was so active as it was in this case to require the patient to be strapped in bed for appendicitis.

Dr. A. J. Coley, of Alexander City, Ala.—I wish to express my high appreciation of the paper that Dr. Oliver has just read, as it is interesting to surgeons and general practitioners, for we are so prone to make such a mistake as was made in some of his cases. For instance, I desire to mention a patient whom I saw in connection with a brother practitioner. She was a neurotic woman; she had had some fever for several days, the cause of which I did not know. Possibly it may have been due to some digestive trouble. This practitioner sent for me to come and see her. I found that she was suffering greatly at the time, with a tumor in the right iliac region. It was hard to believe that this woman was troubled with appendicitis, or whether it was impacted feces or typhoid fever. In order to cover all of the ground we first irrigated the bowels thoroughly and removed the impacted feces. The case proved to be one of typhoid fever, but not appendicitis. I mentioned this case because I did not hear the essayist bring out this special point

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in his paper. I thought that this woman would need an operation, as I was called for that purpose, but on clearing away the doubt in the way of irrigation that disease was set aside.

Dr. J. McFadden Gaston, of Atlanta, Ga.—I wish to say that I consider the subject of the complications of appendicitis very important to bring before any body of surgeons and physicians, because young men in beginning the practice of medicine and surgery will now and then encounter cases. As an illustration, the first case I had operated on for appendicitis was probably one of typhoid fever, and the second one I operated upon was a case complicated with subphrenic abscess. The latter case I reported to the Association at a previous meeting, and a report of it will be found in the Transactions. Dr. Oliver mentioned that as one of the complications in his cases.

In regard to typhoid fever I think it is very essential to study the case or cases very carefully, and even give them a little longer time rather than to operate on every case that has been diagnosticated as appendicitis. It is for that reason that a great many mistakes are made. If there is perforation in typhoid fever, one is warranted probably in operating with a view to trying to save life. I take the position that the essayist does, that it is of advantage sometimes to withhold the knife even in those cases that have been mentioned with the hope of relieving them rather than by operating upon patients whose cases may turn out to be of a typhoid nature. I have been much impressed with the importance of considering complications other than typhoid fever and subphrenic abscess. Let each case be carefully and properly studied. This point I emphasized at a meeting of the Georgia Medical Association.

Dr. John B. Murphy, of Chicago, Ill.—I desire to congratulate Dr. Oliver on the able presentation of his cases and the arrangement of the symptoms. I have had eight cases of typhoid appendicitis that were diagnosticated by me, and of that number I operated upon the first three. I feel that we have to go back to the clinical history of the case rather than the laboratory findings in making a differential diagnosis. Furthermore, I feel that we are drifting away from the practical side of medicine—from the clinical manifestations, and their association with the pathological conditions to the laboratory findings without their individual case significance. The doctor's citation of these cases exactly as they occurred is of the utmost value, both to the practitioner and to the surgeon.

The question as to whether the second case was one of typhoid primarily and of appendicitis secondarily is still open. I did not hear part of Dr. Oliver's paper, and one of the points which I wish he would elucidate is this: How does he account for the infiltration that occurred in the first case which had the large tumor and infiltration of the mesentery? Was the infiltration

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in that case of the same type as infiltration from ulcers of the intestine, particularly of the large intestine, in which the mesointestine is infiltrated and thickened and gives the impression of a tumor mass?

An important part of this discussion is the differentiation between appendicitis and typhoid fever with ulcer in the appendix, and it seems to me that we have to rely almost exclusively on the clinical history for the differentiation. First, that the fever never precedes the pain in appendicitis. Second, that the pain in typhoid appendicitis comes on in the second, third, fourth or fifth day and is never late in this disease. The conditions which give symptoms with a typhoid ulcer in the appendix are the same as those which give symptoms of infection of the appendix; that is, the pain is the result of the compressed, œdematous, inflamed mucosa within the inelastic wall of the appendix, and the nausea and vomiting are the reflex manifestations of that compression. The sudden exacerbation of temperature is due to the rapid absorption which accompanies the infection under compression, and the local tenderness is due to tension on the distended appendix. All of these conditions are identical with those of typhoid ulcer or infection of the appendix, except that the fever precedes the pain.

So far as the physical signs and symptoms are concerned, aside from the clinical history, I believe it is almost impossible to make a differential diagnosis between an ordinary infective appendicitis and a typhoid ulcer in the appendix.

We now come to the other differential point, namely, the Widal test, which, in the early stage, is not present at all as a rule on the third day. Another point is the leukocyte count. The leukocyte count is practically the same whether it is typhoid ulcer or whether it is an infected ulcer with œdema and compression of the mucosa, from the same mechanical and physical conditions. Therefore, we must be more particular in laying stress on the pronounced manifestations of the inflammatory condition.

My last five cases, in which I made a diagnosis of typhoid ulcer in the appendix, all of which I refused to operate, went through the typical typhoid course afterward with positive Widal. The latest appendical manifestation was four days after the onset of the typhoid symptoms after the first temperature in the case. In all of the later cases, however, I had positive evidence of temperature. If I did not have positive evidence of temperature, I could not have had a differential diagnosis between typhoid ulcer in the appendix and an ordinary infective lesion of the appendix. All of the cases recovered, those that were operated upon as well as those that were not operated.

The question arises as to what we should do under such circumstances. Should we or should we not operate when we have

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the manifestations of acute appendicitis, yet are unable to determine a preceding temperature, unable to get a history of prodroma, and unable to get clinical indications that the typhoid preceded the early appendical manifestations? It would seem to me that our line of action is clearly this: that as typhoid appendicitis is a much more rare condition than the other, and unless in the presence of an epidemic with other pronounced prodromes than temperature absent, we should make an exploratory incision and determine the character of the lesion, because the danger of opening the abdomen and lifting up an appendix that has a typhoid ulcer is comparatively little compared to the danger of acute appendicitis. Besides, my operated cases went through the ordinary course of typhoid fever without any interference from an exploratory laparotomy. In the first three cases I removed the appendix because it was ulcerated and swollen, and in each of them we found typical typhoid ulers in the ileum as well as in the appendix.

Dr. Oliver (closing).—I think that two of the cases reported show the contrast very well, and also indicate that symptoms very closely resembling appendicitis may be produced without the appendix itself being involved in the typhoid process. In the first case I reported, the appendix was normal. It was not only found to be normal at the time of operation, but in the laboratory after death, yet in this case the symptoms presented were typical of appendicitis. In one of the other cases the appendix was involved; that is, there were typhoid ulcers in the appendix. Very likely Dr. Murphy did not hear the first part of the report of that case. My idea was not that it was a case of primary fever, but that it was one primarily of appendicitis, which attack passed off, and within four weeks typhoid fever supervened; so that I want to correct that impression.

One of the most important points brought out by this subject is the possibility of a tumor in the right iliac fossa in typhoid fever, and it is a point that has not been sufficiently brought forward and emphasized.

I am very much obliged to the members for their discussion.

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THE PROBLEMS PRESENTED TO THE GYNECOLOGIST TWENTY-FIVE YEARS AGO AND TO-DAY.

By P. F. Chambers, M.D.,
New York City.

When I was asked to read a paper before your body, I decided at first to present for your consideration what we often hear called Conservative Gynecology. This subject I at once rejected for the reason that in medicine as well as in politics and religion the word conservative has become synonymous with timid, old fogy, opposed to change, and has lost its real meaning, to conserve or to preserve; moreover, I did not wish to confine myself solely to the description of preventive methods, but rather to show what has led up to the modern trend of gynecology and to the problems of to-day. It has become quite the fashion with some of the recent writers to speak of the radicalism of twenty-five years ago, and of the conservatism of to-day with more or less glorification of the modern methods. This is an incorrect and unjust arraignment of the masters of that date, and the future alone can tell how true this is with regard to to-day.

The radicalism of gynecology came at a more recent date than twenty-five years ago, and the pendulum is only now on the return stroke. Whether the pendulum has swung back too far or not quite far enough is yet a question. The problems presented to the gynecologists of that date were entirely different from those of to-day, and as different, I have no doubt, as will be those of twenty-five years hence.

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Dr. J. Marion Sims, the father of American gynecology, made his reputation by inventing a vaginal speculum, by using a suture of silver wire, and by closing successfully in 1849 a vesicovaginal fistula. At that time MacDowell had performed his noted operation for the removal of an ovarian cyst, and this had also been done by other operators in both this country and Europe; but such operations were regarded as curiosities of surgery. The problems for the gynecologists of that date were thought to be of an entirely different nature, and would be found through the vagina; consequently great value was placed upon Sims' discoveries, especially upon his speculum, that allowed the thorough exposure and consequent inspection of the entire vagina, as compared with the old cylindrical speculum, which only gave a glimpse of the far-off os uteri.

Just twenty-five years ago I entered the Woman's Hospital in the State of New York as an interne. Drs. T. G. Thomas, T. A. Emmet, J. B. Hunter, Nathan Bozeman, and Charles Carrol Lee were the attending surgeons, all of whom, I think you will agree, were representative men of that date.

To illustrate the class of diseases then admitted to hospitals and the methods of treating then in vogue, I wish to give you the diagnoses of all the patients who were in the Woman's Hospital on that date, and the operations which were there performed for the relief of these conditions.

The total number of diagnoses were 104. Of these there were 22 cases of lacerated cervix with 22 operations; 21 lacerated perinei with 21 operations; 3 subperitoneal uterine fibroids with 2 operations; 2 vesicovaginal fistulæ with 2 operations; 6 cases of cellulitis with no operations; 16 anteflexions with 2 operations; 7 retroflexions, no operations; these were treated with pessaries; 1 was cured, 3 were improved, and 3 were not improved; 6 ovarian cystic tumors with 6 operations; of these, 2 died and 4 recovered; 3 cases of chronic cystitis, in 2 of which artificial vesicovaginal

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fistulæ were made; 1 case of uterine atrophy and 1 fissure of the rectum, both not treated; 3 atresia vaginæ with 1 operation; 1 chronic ovaritis, not treated; 1 prolapsed ovary, improved under treatment; 1 uterine polypus, not treated; 1 interstitial fibroid, for which the uterus was curetted and patient improved; 1 carcinoma of the omentum, with operation; 2 hemorrhoids with 2 operations; 1 case of abscess of labia and 1 tumor of breast, both operated; 1 pregnancy not treated; 2 cases of vaginitis, not operated upon, and 1 case of menorrhagia, which was curetted. At a glance you will see that over 90 per cent. of the operations were for injuries of parturition and were of a plastic nature. The only abdominal operations were for 6 ovarian cysts with 2 deaths, 1 subperitoneal uterine fibroid, exploratory incision with a death, and 1 carcinoma of the omentum, exploratory incision and death. This record is fully up to the best average of that date. To say the least, it is not one that held out much encouragement to open the abdomen unless it was absolutely necessary.

The peritoneum was the surgeon's *bête noir*. Abdominal surgery, then in its infancy, constituted but a little part of the gynecologist's work. This was before the days of asepsis. Antiseptic surgery was then in vogue. Consequently, the mortality of all abdominal work was still so great that the abdomen was never opened except in desperate cases, such as for removal of ovarian cysts, or the ovaries in cases of intensely severe dysmenorrhœa or very large fibroids, as then advocated by Betty, Tate, or Hagar. For other causes, for which we now readily open the abdomen, it was then a sealed book. "But the womb, being reachable, seeable, and directly treatable," was accused of most of the ills to which women were subject. Consequently, it was overtreated and much maltreated. Moreover, before twenty years ago no department of medicine was so poorly taught and improperly practised as the department of obstetrics. At that time the work of the gynecologist was chiefly to repair the damage

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left by his coadjutor, because when the obstetrician did no injury by a too early, too late, or too imperfect an interference, he usually introduced sepsis, which left important diseased conditions. With the introduction of improved obstetrics many of the supposed causes of woman's ailments were eliminated, and it began to look as though the work of the gynecologist would cease, but in spite of the diminution of the traumatic injuries many of the ailments continued. Some of the masters then began to look elsewhere, and to suspect that there were ills of women other than those caused by a lacerated cervix.

With the advent of asepsis, the discovery of the Trendelenburg posture and the improvement of the other aids, resulting in a decreased mortality rate, the abdomen from having been the sealed book now became the most inviting field for surgical exploitation. The wave of enthusiasm seemed to permeate the entire profession, for there was at the time no other field where the possibility and incentive to do good work and much work was so good. But unfortunately there was no field where the work actually accomplished was so faulty or the privileges so abused. There grew up such a recklessness engendered by a feeling of safety that the then most delicate, to say nothing of the most serious, operations in point of social and vital consequence to the patients were undertaken by men of no experience, men who would not have dared do a capital operation upon any other portion of the body, where their poor surgery could be detected, but, having attended a few clinics, or taken a course at some post-graduate school, felt anxious to demonstrate their skill.

One of the explanations, and I might say the most mitigating circumstance, was the willingness and often the solicitation on the part of the patient and her friends that this work should be unadvisedly done. To a woman who is in a state of chronic invalidism, who is but half a wife or mother, especially if she has been for a length of time under other

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treatment with little or no relief, the prospect and often promise of a cure offered to her if she should undergo an operation was often too alluring to be rejected; neither should they be rejected, and it is not my intention to decry or advise in the slightest degree against it; but as there are no class of patients who should call upon us more for sympathy than our mothers, wives, or sisters, neither are there any who have a better right to demand the very best there is in us, not only to make them healthy, but to restore them to the proper kind of health. Let me give you an illustration of this point. A few years ago I met an old patient upon whom Dr. T. G. Thomas had operated years previous, removing both ovaries, for severe pain of which the patient then chiefly complained. The operation had changed the woman as much as could be imagined. From having been a suffering, nervous wreck, a burden to herself and family, she was now robust, strong, and well; but her greeting to me was that she considered Dr. Thomas and I had done the worst thing possible to a woman; that although we had restored her health and given her better health than she had ever before had, we had nevertheless made her different from other women, and as a consequence she was estranged from her husband. I am now inclined to think she was right. In other words, we had relieved pain, but we had abolished function. The poorest way to cure an organ is to remove it. Of course, there are many cases where the removal of an organ is necessary, such as for malignancy, but I am convinced that the more experienced we become the fewer will be the total extirpations, not only of all, but also of any of the organs of the pelvis.

A few years ago we all taught and practised hysterectomy for fibroids, and even advised it in cases of pus tubes, where adhesions were extensive, arguing that with the absence of the ovaries and tubes the uterus was useless. Those were the days of radical gynecology. Now a hysterectomy for a simple fibroid, or for even multiple fibroids, should only be

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done as a *dernier ressort*. But as radicalism led us then to one extreme, do not allow ourselves now by so-called conservatism to be carried to the other. As you all know, pain is usually the symptom which causes a woman to seek relief in an operation. If upon her so-called recovery she finds she still has the pain it will prove but little consolation to her to be told that the diseased portion of the organ has been removed. Most women, especially hospital patients, care very little about the certainty of menstruation or the possibility of pregnancy. In fact, nearly all of them had rather be free from the possibility of either, and if the pain of which they complained returns, they are more than apt to roundly condemn your conservatism. In other words, the time and manner of practising the so-called conservatism upon the female organs of generation will have to depend to a large extent upon each individual case, and the judgment of the operator. No hard and fast laws can be laid down to the general surgeon as to when or how much of a leg he shall amputate in case of compound fracture, and neither can arbitrary rules be applied to operations upon the organs of the pelvis. The ovaries in woman, like the testicles in man, exert an influence as internal secreting organs, but they have much less to do with the sexual desires. With the great majority of women their sexual passions are subordinated by their affections, and except in a psychological way are but little affected by the removal of the ovaries, while a diseased ovary will, on account of pain during coitus, prohibit the orgasm. But there are many other factors in each and every case that may have to determine our course of procedure. In the first place, the age of the patients. We would hesitate to remove the ovaries from a girl, where no questions would be raised in a woman past the child-bearing age. On the other hand, when the operation would be called for in a young woman for the removal of a fibroid, in an elderly woman it might safely be left.

The social position of the patient is also a determining

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factor. The working woman depending upon her own exertion cannot afford the luxury, so to speak, of protracted treatment, but would require an operation for immediate and certain relief, but in the case of her more fortunate sister more time is permitted and, as a result, should be demanded. Again, conservative work requires a longer time than the simple removal of an organ, and the physical condition of the patient at the time may be a deciding cause. When for any reason an heir is especially desired, either to inherit property or gratify the wishes of husband and wife, we may be compelled to do the conservative work when our better judgment would prompt us to be more radical.

Abdominal sections for sterility, when sterility alone is the symptom, has proven a very uncertain procedure unless there be a history of some previous inflammation. The operation then is a thoroughly justifiable procedure.

The sterility will more than probably be found due to adhesions or occlusion of the lumen of the tubes which follow some old inflammation of the tube or ovary. The organs presenting problems to the gynecologist of to-day I would place according to their importance in the reverse order to that of twenty-five years ago; placing the ovaries first, the tubes second, and the uterus third. Of the ovaries, the most perplexing problem is that regarding this same so-called conservative work and the proper method of doing it, for while I think we are all pretty well agreed that the best method of dealing with the fibroid uterus is, if possible, to remove the fibroids and leave the uterus, and in cases of salpingitis, no matter of what nature, to treat the tubes so that as much of them as possible will be left. With some operators there is some doubt as to the best method to use; in cases of ovaries that are in a state of cystic degeneration, whether it is better to simply break up all adhesions if they decide to leave the ovaries and protect them with Cargile membrane to prevent readhesions and trust to nature to get rid of the cysts, or whether it is better to at once remove

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all of the diseased tissue and leave the very small portion of healthy ovarian tissue. The latter procedure has more forcibly appealed to me. It is a method which I have adopted for the past three years, and although I have had some cases which returned to me but little improved, and have had others come to me who have been operated upon by other surgeons with the same result, still the result of this latter operation in the great majority of my cases has been so exceedingly satisfactory that until something else is suggested that appeals to me more forcibly, I shall continue so to treat this class of cases. When I consider carefully the reasons why a few of these cases were not entirely improved by this operation, I think that the results were due to an imperfect technique rather than to an improper method. In the first place, I think now that formerly I used too large catgut in suturing the ovary, and in others I probably failed to accurately coaptate the edges. I now use a No. 0 or 00 ten-day chromic gut for this purpose; the larger sizes are not readily absorbed, and will cause irritation and adhesions, which are the causes of the subsequent pain. The same would result from poorly approximated edges. Adhesions are the causes of most postoperative abdominal pains, and in my subsequent work I have earnestly attempted to avoid them.

When the cysts are very small enlarged ovisacs, a simple puncture to allow an escape of the fluid is all that is necessary, but if the cyst is larger or there are numbers of them, it is then better to remove the entire diseased portion, leaving only the healthy ovarian tissue, for no matter how small a portion of healthy tissue is left, the ovarian functions are maintained, and though it is not safe to promise, there will be no return if only healthy tissue is left. On the other hand, the retention of diseased tissue is more than apt to cause a recurrence of the trouble. When for any cause all ovarian tissue has been removed, the reimplantation of the healthy ovarian tissue in the broad ligaments has been

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attended with very satisfactory results, and ovulation and menstruation continue. But the results of transplantation of healthy ovaries from one woman to another, or from one lower animal to another, have so far proved a failure. The ovary soon disappears by digestion and absorption. Immunizing one animal with the serum of another has had no effect to counteract this; so it seems we cannot yet count upon the restoration of the ovary and the ovarian functions when they have once been removed. While statistics have proven that a sufficiently large number of women became pregnant after the conservative operation upon the ovaries, we cannot by any means expect a similar result from a transplanted ovary, or even a reimplanted ovary. All we have a right to expect under the circumstances would be a continuation of ovulation and consequent menstruation with its associated psychological effect and possibly other associated effects due to internal ovarian secretions.

The treatment of the tubes also presents problems. In the first place, by the history of each case, we should ascertain whether a salpingitis is present which is gonorrhœa or a result of abortion or puerperal sepsis, or whether we have simply a hematosalpinx or hydrosalpinx. If the former, of course, greater precaution should be taken to prevent spread of the sepsis, and to destroy the septic germs. Landau is opposed to opening the distal end of a gonorrhœal tube which nature has closed, and says that why more women do not die is because the ostium is again at once closed. But I have found that if the tube or tubes are opened, the inner membrane thoroughly cleansed, and the entire surface painted with a 50 per cent. solution of argyrol, and after a few moments washed off with a normal salt solution, and edges accurately approximated and closed with the running suture of No. 0 chromic ten-day gut, there is no danger of the sepsis spreading. Should it be the distal end only of the tubes which is diseased, it is better often simply to remove the diseased portion and then stitch the healthy end as near

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the ovary as possible. In either case a probe should be passed into the uterus to be certain of the patency of the canal. In cases of hematosalpinx or hydrosalpinx the cause is probably due to an obstruction in the canal caused by a kink or bend as a result of a retroverted uterus or prolapsed uterus and ovary, and is relieved by a replacement of the uterus, or suturing of the ovary at the proper plane in the pelvis. At the same time it is usually better to empty the tube by aspiration or a simple incision. If the uterus is retroverted or prolapsed it should be replaced and held in position by the operation of ventral suspension or shortening of the round ligament. Ventrosuspension I do with four sutures, two forty-day No. 1 chromicized gut and two silkworm-gut sutures, alternating with each other. The chromicized catgut sutures are passed simply through the parietal peritoneum and peritoneal covering of the anterior fundus of the uterus. They are, of course, buried sutures. The silkworm sutures are passed through the skin and abdominal wall, also catching the peritoneun on the outer wall of the fundus of the uterus. The silkworm sutures are removed in ten days. They are simply used as a precautionary means to prevent a possible giving way of the catgut sutures.

I prefer the ventrosuspension in all cases except where the retroversion is due simply to an elongation of the ligaments, and when the uterus is small, and easily replaced, and the force from above is slight. Then I would perform the operation for shortening of the round ligaments either by exsecting a portion of the ligament and bringing the ends together, or by looping the tube upon itself. I never do a ventrofixation.

An example of conservative surgery upon the uterus is given in the case of fibroids. Of course, a fibroid may be so situated that it cannot be removed and a hysterectomy may be necessary. But in the great majority of cases the uterus can be saved by simply splitting the capsule and shelling out the tumor. The greatest precautions should be taken, however, not to leave any more open spaces than

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possible for the collection of blood clots, often the cause of pulmonary embolism. If the walls cannot be approximated everywhere, then openings should be made into the uterine canal for drainage, and a small packing of gauze be passed through into the vagina. I much prefer though to approximate the walls, if possible, by several layers of fine catgut, and make no opening into the uterine canal, thereby lessening materially the risk of infection. In either case the peritoneal edges are to be accurately approximated.

In connection with conservative work upon the uterus, I wish to add a few words with regard to the use and abuse of the curette. Of all surgical instruments I think the sharp curette comes nearest being the invention of the devil. It is a most dangerous instrument in the hands of the most skilful operators, but nevertheless is in constant use by every would-be gynecologist. It may be sometimes permissible in treating the glands of the cervical canal, but should never be inserted above the internal os. Fungoids or retained secundines can be removed by the blunt curette, a perfectly safe and efficient instrument. Other troubles for which the sharp curette is used can be treated better by other means.

The impression that seems to have grown in the mind of the profession that gynecology is purely operative and especially of a major character is a grave mistake. Many of the inflammatory conditions of the uterus, tubes, and ovaries were successfully treated formerly without operations, and this is just as possible now. Although most of the problems of twenty-five years ago are not pertinent to-day, still the unsolved problems and lessons learned are just as important now, and the necessity to properly perform the operations taught by Sims, Thomas, and Emmet are just as essential. Obstetrics have greatly improved, but, in spite of the most thorough care, obstetrical injuries will occur demanding the services of the skilled gynecologist, and the future welfare of women will depend as greatly upon the

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proper repair of the lacerated cervix, of the lacerated perineum, or of the vesicovaginal fistulæ, as upon the proper treatment of the ovary or tube. The amputation of the cervix when a trachelorrhaphy is called for, and the closure of a vesicovaginal fistula or lacerated perineum through the sphincter, call for as much skill and experience as any operations in surgery. I know of no other operations attended so often with a failure and attended with more disagreeable consequences. The patient becomes a nuisance to herself and obnoxious to her friends and family. Formerly the test of a gynecologist's ability as a plastic surgeon was the ability to close a laceration of the perineum through the sphincter and rectovaginal wall. I feel assured it is as much so to-day. The failures in the operations are always attended with much loss of reputation for the surgeon, and, conversely, no other successful operation brings more happiness to a patient and friends or adds more to the good repute of the operator. While a woman naturally is not inclined to talk of the loss of her ovaries, being conscious that thereby she is different from other women, she feels that the closing of a torn perineum returns her to her normal condition. The technique of the operations for vesicovaginal fistulæ and for lacerated cervix have not been changed since perfected by Sims and Emmet, but with better suture material the results of the operation for lacerations of the perineum through the sphincter have been much better.

Silver wire, formerly the only aseptic suture, was too harsh for the rectal mucous membrane, and silk and catgut, the other sutures then used, soon conveyed infection into the tissues. The result was that the operation most often failed. At the present time, by use of fine interrupted silkworm-gut sutures in the rectal membrane, and No. 1 forty-day chromic gut in the vaginal membrane, the field of the operation remains aseptic, and a satisfactory result is obtained.

In this connection I wish to say a few words with regard to our ligatures and suture material. If I were asked to

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what one thing in aseptic surgery I give most importance, I would undoubtedly say my ligatures. In former days when the mortality of abdominal cases was much greater, I observed that the ligature seemed the nucleus of infection, and when I now recall how we of the house staff were instructed to prepare the ligatures, the wonder is not that we lost so many patients, but rather that we saved so many as we did. In all of the larger hospitals the sterilizing plants are capable of preparing the catgut, but for my private work, and even for my hospital work, I much prefer the gut prepared by a reliable manufacturer, and in using such gut, the smaller the size the better.

DISCUSSION.

Dr. A. Palmer Dudley, of New York City.—As a colleague of the reader of the paper, and also a graduate of the Woman's Hospital, I cannot let this contribution go by without endorsing it, and also pointing out some of the essential features raised by the essayist, because I had my experience a little later than the author did in the Woman's Hospital, and what we saw at the hands of the brightest men of that day we have advocated largely at the present time, showing that the truth of this statement is trite, that in twenty-five years from to-day we shall be as much laid upon the shelf in our records as we shall be in our last day. It is a fact that the improvement has been so great that we seldom see a vesicovaginal fistula to-day. The surgical obstetrician is up to the times. He has very little use, in fact, for the gynecologist. Not only that, but post-graduate teaching is spreading so rapidly over this country that cases that were formerly brought to New York to eminent men do not go away from their own homes nowadays. They have men in their own towns and cities who can do the work as well as it was done in those days, and, I am sure, as has been said, by a change of work (a change in the method of suturing) we will succeed in obtaining better results at the present time than were obtained in those days. I remember very well that we of the house staff used to make bets and wager dinners to one another as to how long a patient would survive after an abdominal section, and one or the other of us usually won. At the present time the records, as prsented by Dr. Chambers, show a mortality which compares very favorably with that given by Dr. Mayo yesterday, a mortality that is really startling as we look back into the past. Just

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think of it! Anyone who attempted gall-bladder surgery in those days was not only considered pehaps a villain, but he was the subject of suits for malpractice; so that I hope the members will not let a paper of this kind go by without giving it a good and thorough discussion. I cannot use the time of the Association to take up the different points that have been raised, but there are doubtless those in the audience who have some desire to make mention of a change in some specified manner of treatment; so I simply rise to open the discussion and urge upon the members that they do not let it go by without thorough discussion.

Dr. Herman J. Boldt, of New York City.—I was very much interested in the paper, as no doubt all of those present were. The question struck me as what is to be understood by conservative surgery? Are we to understand by conservative surgery that if a woman has small cystic degeneration of the ovaries, and we resect a part of a cystic degenerated ovary, that that is conservative surgery? It was at one time so considered. At the present time—at least, in my opinion—we have no right to so consider it. If we are to consider conservative surgery on the ovary, I can only take those cases into consideration where we have a true ovarian tumor developed, whether that ovarian tumor be of the ordinary, large cystic variety, as a large ovarian cyst, or whether it be a dermoid tumor or colloid ovarian tumor. When we have a part of the ovarian structure still in an apparently healthy condition, and we then remove all of the diseased part, that is, the entire ovarian tumor, only retaining a small zone of healthy ovarian stroma, that I consider conservative surgery or proper surgical intervention. A small cystic degeneration as such, so far as my observation is concerned, although we may consider it from a pathological viewpoint, is the result of a low grade of inflammation; at the same time, I cannot recall that it has caused any symptoms sufficiently severe to demand surgical intervention. On the other hand, let us take the suppurative form of salpingitis. Whether the pyosalpinx be due to gonorrhœa, or to septic infection caused by traumatism or by the puerperium—whenever that form of salpingitis becomes chronic, and we open the abdomen and endeavor to retain part of such Fallopian tube by doing conservative surgery, so far as my personal observation goes, such cases have not done well. They would eventually require more radical intervention and the removal of that particular Fallopian tube. Such patients, unless this was done, never made satisfactory recoveries. Whether the ovary is involved or not, I would resect the tube and attach the ovary to the uterine cornu.

Again, with fibromyomata, I believe it to be the best course to pursue, and I think everyone will coincide with me when I

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say that it is desirable to retain as much of the uterine structure with the appendages as possible, provided the adnexæ are in a healthy condition. When, however, we have multiple fibroids and must necessarily leave many lacerated beds, I believe it is much better surgery to do a supravaginal amputation and only leave as much uterine structure as possible, removing the entire diseased area or neoplasms rather than try to enucleate myomata from their various beds and sew up the uterus. I believe the prognosis is far better when that is done.

DR. W. P. CARR, of Washington, D. C.—I was a little surprised at one statement made by Dr. Boldt, that cystic ovaries do not give very much trouble.

DR. BOLDT.—I had reference to small cystic ovaries.

DR. CARR.—Small multiple cysts in the ovary in my experience have been painful and have caused much discomfort, even more discomfort and pain than large ovarian tumors. I have seen attempts made at conservative surgery in these small cystic ovaries, and have punctured cysts myself, but in nearly every case where that has been done the ovary was removed later. I think we are justified always in removing a cystic ovary whenever it is exposed to view. It has been my experience in the last year to have met with a number of cases of that sort in operating for appendicitis. I have opened the abdomen and have found nothing but a cystic ovary in the neighborhood of the appendix, with sometimes a little catarrhal appendicitis, the symptoms being due entirely to the cystic ovary. These were small cysts in the ovary itself, the ovary not being more than twice or three times its normal size.

DR. JOHN B. MURPHY, of Chicago, Ill.—I wish to congratulate the essayist on the scope and conservatism which his paper indicates. He has so thoroughly covered the lesions in certain parts that it is unnecessary to mention them again. Oöphorectomy for a small cyst has gone. Salpingectomy for postpuerperal and postabortive occlusion of the fimbriated end of the tube without gonorrhœa has gone. Hysterectomy for the small fibroid has gone. The pan operation, too, is a thing of the past. The one thing that remains, and which I feel as a general surgeon should have attention in this body, is the curette. It is, I think, the most damnable instrument in the whole field of surgery and gynecology, not because it has not a proper place, but because it is so outrageously abused. It is thoughtlessly used; it is too freely used; it is too frequently used, and on account of its abuse it is very destructive to human life. I feel, Mr. Chairman, that gynecologists, general practitioners, and surgeons who think about the welfare of patients should take up the fight against the abuse of the curette. Who would think of using a curette on the conjunctiva? Still we know that the curette has a proper place in certain diseases of this mucous

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membrane. In the uterus it cuts the tissue with which it comes in contact, and particularly the recently constructed razor-edged curette, which is as sharp as a razor, and the spoon part almost as large a surface as that on my thumb. This instrument is used for the purpose of curettement, regardless of whether the lesion is a purulent infection of the ovary; regardless of whether the lesion is a purulent infection in the tube, discharging its pus on to the surface of the uterus and keeping up the leucorrhœa; regardless of whether it is a lesion of the mucosa of the uterus itself, or of the vaginal mucosa, they use it almost as regularly as they use a toothbrush, which they often carry in the same vest pocket with the curette. It is the abuse of the instrument that should be emphasized. There is no instrument or practice that brings more severe, critical, and dangerous cases to my attention in the hospital to-day than the abuse of this instrument. Let me cite one case that occurred within the last two weeks, and apparently the man who used the curette in this case was a good practitioner. He pulled the patient to the side of the bed; the nurse gave her some chloroform and the practitioner immediately began curetting. This was on Wednesday. The woman had a temperature of 105°. On Saturday he then examined her and found that the intestines and omentum were in the vagina; and then through some error of judgment, which I will not endeavor to explain, he thought this mass in the vagina was the cord of a fœtus, and began to tear off the mesentery from the intestine, and after removing about eighteen inches of mesentery without dividing the cord, he concluded that this was possibly intestine. The patient was brought to the hospital. The large intestine was the part assailed. A resection of eighteen inches of the bowel was immediately made with side to side anastomosis with the button, and, fortunately for all concerned, the patient recovered.

Let us see what happened. He used the sharp curette and curetted away the posterior wall of the uterus completely, and entered the peritoneal cavity. Fortunately that rarely occurs, but what does occur in so many cases is that the uterine mucosa and glands are entirely removed by these sharp curettes, and we have pitiable subjects coming into our offices suffering from half-day menstruation with pains which occur when the mucosa has been removed, and presenting the manifestations of an early menopause, and, in addition to that, having a uterus that is incapable of pregnancy.

The results to such patients are disastrous. Then again the curettage often starts an acute sepsis when a latent infection is present in the tubes, ovaries, or cellular tissue. This acute pelvic peritonitis can, and not infrequently does, terminate fatally. The curette is very frequently used with fatal effect in ectopic pregnancy. The effect of expulsion from the tube is diagnosed as an impending abortion and the curette is used to complete

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the work. It forces the expulsion from the tube, and the fatal hemorrhage or peritonitis follows, etc., etc., *ad nauseam.*

Dr. Chambers (closing).—I wish to thank the gentlemen for their discussion, and in conclusion to endorse fully every word Dr. Murphy has said with regard to the use of the curette. I think it has been the cause probably of more injury to woman than any other one instrument, and for one I would gladly see every one of them destroyed.

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THE MANAGEMENT OF ACUTE GENERAL PERITONITIS.

By J. Garland Sherrill, M.D.,
Louisville.

Two forms of this affection are to be recognized clinically: the first, acute septic peritonitis, in which the poison is so intense that the patient dies from a profound toxæmia before the local changes have progressed to the point of pus formation. Such cases follow perforating wounds of the intestine, perforation from typhoid fever and ulcer of the stomach, gangrene and ulceration of the appendix, rupture of the urinary bladder or gall-bladder, acute cholecystitis, ileus, puerperal infection, and less frequently from disease of the tubes and ovaries. The latter conditions are more often followed by a localized form of inflammation as a result, perhaps, of a less virulent infection, and because of the partial isolation of the pelvic structures from the other abdominal viscera. The second type is general suppurative peritonitis, in which pus is found free in the peritoneal cavity without any localization of the process, and the term should not be strictly limited to inflammation of the entire serous surface. This form may follow any of the causes mentioned above, but is especially prone to result from rupture of an appendicular or other abscess into the cavity. It would seem that these cases go on to suppuration because of a partial immunity which has developed during the time the causative abscess has been forming, which increases the local response to the irritant and causes the disease to be prolonged sufficiently for pus

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formation to occur. Notwithstanding the possibility of such resistance to the infection, these cases must be considered as very grave. While they may not be so rapidly fatal as the septic type, they are exceedingly likely to terminate in the same way. To account for the difference in these two forms as regards toxæmia, we must take into consideration the absorptive power of the peritoneal surface. This large lymph sac has great absorbing capacity and, when the more intense infections obtain entrance, the chemical products are very rapidly carried into the circulation; but when a local reaction is excited by a less virulent infection, the lymph channels become choked with leukocytes, and just in proportion to this obstruction is absorption diminished. Finally, as suppuration occurs, numbers of leukocytes, lymph, and serum appear on the membrane accompanied by exfoliated epithelium, and it is possible that here again an absorbent surface is present. It would seem probable, then, that the suppurative cases are the more favorable ones for treatment.

It has been claimed by very many competent observers that septic peritonitis cases all die, and that postoperative cases are likewise always fatal; yet there are on record a number of cases of recovery from operations done for the relief of these conditions; notably, Hintze (*American Journal of the Medical Sciences*, vol. cxxiii. p. 182) reports two successful operations for postoperative peritonitis.

We are forced to admit that many cases, especially of the septic type, will die, no matter how soon they are seen nor what plan of treatment is adopted. On the other hand, we may safely claim that there is a large proportion of cases which can be relieved by surgical interference, and some which can be conducted to a favorable issue by medical means alone. That the latter is successful in any large number of cases we cannot admit, but when we consider that every case begins at a local point of infection it is certainly true that medical measures are effective in some

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cases in keeping the process limited to a local inflammation. In offering this paper I make no claim to present anything new, but do so with a desire to elicit from a discussion of this most interesting subject some ground upon which those who hold very widely different views can meet and formulate some reasonable plan of treatment which, with slight modification to suit individual cases, can be generally adopted by the profession. With the best authorities at variance upon a subject of this importance, the average practitioner is left quite at sea. The first question for consideration is, whether medical treatment or surgery offers most to these unfortunate individuals. Prior to 1843, when Volz advised the use of opium in these cases, the results were uniformly bad. This plan of treatment, first urged upon the profession of this country by Alonzo Clark, showed a considerably lower rate of mortality than the former methods in use, and was almost exclusively followed until Tait urged the administration of salines to drain the inflamed peritoneum, and brought about another radical change in the treatment. The opium treatment is based upon the idea that by preventing peristalsis adhesions form between the intestines, leakage is diminished, and tissue resistance can overcome the infection. The second plan is founded upon a radically different idea, namely, that in inflammation of the general peritoneum salines remove offending material from the intestine and cause rapid removal of fluids from the blood, and an equally rapid elimination from the peritoneal cavity of the poison produced by the mycotic growth. More recently there has been a tendency to the rest treatment of inflammatory conditions within the abdomen, largely as the result of the stand taken by Ochsner upon the treatment of appendicitis. He claims to get a quiet intestine and the relief of pain by emptying the stomach, allowing nothing to be taken into its lumen, and avoiding the bad effects of opium, such as meteorism, constipation, and diminished kidney secretion Others are using opium for the pain, salines to move the

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bowels, and are giving some food by the mouth. We find therefore three distinct plans of treatment, each of which has been perhaps of benefit in some cases. As to which of these is best in cases where surgery is not indicated, or will not be permitted, it is difficult to determine. Ochsner's statistics seem to show the lowest mortality when the disease follows appendicitis.

I must confess that my cases have usually been considered surgical; therefore, I cannot deny his claims. I can see the advantage to be gained by relieving the stomach of the highly toxic fluids which are carried into it by reverse peristalsis, but I can more readily perceive the benefit to be obtained from a brisk purge in non-perforative cases and as well after a perforation has been closed by operation. It is generally admitted that this is a bacterial disease frequently due to perforation of the alimentary canal, or to rupture of an abscess, various forms of organisms being found in different cases. The claim is justifiable that in the inception this is always a local infection, and in the large majority of cases its prompt recognition places it within the domain of surgery. Medical treatment is then indicated only in those cases where surgical aid is refused by the patient, and in those in which the grave condition of the patient renders it likely that an operation will remove the slight chance remaining for recovery. In cases seen early, where operation is refused, it is exceedingly important before medical treatment is commenced to determine if possible the causative lesion. In many cases this cannot be done, but careful attention to the history and symptomatology will, in a majority of the cases, enable the attendant to reach a conclusion upon which he may plan a logical course of treatment. In order to make clear this point, it will be necessary to distinguish not only between perforative and non-perforative cases, but also between perforations of the stomach and those of the intestine. We will, therefore, consider the form due to perforating ulcer of the stomach from a medical viewpoint.

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The first importance should be given to absolute rest of the stomach, no lavage, no food, no medicine, no water nor anything else being allowed. Enemata to unload the lower bowel and relieve meteorism should be used. Colon lavage can be safely employed if necessary, followed by nutrient enemata as indicated. If there is reason to believe that the rupture is posterior, the hips and the shoulders as well can be raised with a view to retain the process in the smaller sac of the peritoneum, as recommended by Lennander. The employment of heat or cold locally can be tried here as in all other varieties.

When the rupture is lower in the alimentary canal, and in cases of obstruction where there is danger or possibility of a rupture, gastric lavage can be safely employed, but purgation and even large enemata are very dangerous. One case coming under my care with rupture from a blow was lost, probably because of injudicious efforts to cleanse the lower bowel, none of the fluid returning. Absolutely nothing should enter the stomach after it has been thoroughly cleansed. Small enemata of concentrated solution of sulphate of magnesia with glycerin can be used to empty the rectum, and small nutrient enemata administered at proper intervals. If opium has any place in the treatment of peritonitis it is in a case of this kind, and it can be given quite fearlessly. The patient should be placed in a position of simple recumbency.

In cases following puerperal infection, surgical operation, the rupture of an abscess, and rupture of the appendix, a very different plan of treatment should be employed. Rupture of the appendix has been included under this division because the appendix which ruptures is, in the vast majority of cases, one whose lumen has become to a great extent isolated from the bowel, owing to the great swelling of the lymphoid tissue, or on account of torsion or in some instances from cicatricial contraction. In favor of this view is the fact that one of the prominent factors in the production of inflammation of the

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appendix is an admitted inability of the organ to empty itself. Therefore, the danger following a ruptured appendix is not from fecal extravasation, but from the contained bacterial flora. There being little danger, then, of further increase in the dosage of the poison, I believe we are justified in the use of purgatives in this condition, and in ruptured abscess and postoperative cases as well. It appears to me to be good practice to obtain a clean alimentary tract in cases of this character, because a prolific source of infection can be removed by elimination of the feces, also by causing a rapid osmosis from the peritoneal cavity without increased danger. My attention has been drawn to the acridity of the feces by some cases of large appendicular abscess of more than one week's standing in which a communication existed with the lumen of the cæcum. After the abscess had been opened and its cavity cleansed, I have noted that the discharging feces was so poisonous that it produced marked sloughing of the wound margins. This sloughing only subsided when the alimentary canal had been thoroughly flushed by a brisk purge. The contention then seems reasonable that in cases where there is no leaking intestine, the treatment by gastric and rectal lavage and brisk saline catharsis is indicated. I do not mean to say that in all cases we can certainly exclude a leaking bowel, but when we can do so this should be our plan. I would especially urge that in the management of these cases routine treatment should be eliminated as nearly as possible. It is extremely doubtful whether in any of these forms of peritonitis topical applications, other than heat or cold, ever do any good. Leeching has some advocates and is perhaps worthy of a trial. In cases due to streptococcic infection, as shown by the presence of the organism in the blood, antistreptococcic serum should be tried. Careful stimulation should be given in all forms.

In considering the surgical treatment of this disease, much stress should be placed upon operation as a measure for the prevention of general peritonitis. In the largest number of

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cases prompt interference for the relief of any of the causative conditions before the serosa is soiled, or while the peritonitis is still confined to a limited portion of the membrane, offers the best chance of recovery.

Then, in all cases save where the two conditions already mentioned prevent operation, a section is indicated. The outcome of a given case will depend upon the following factors, without reference to the special steps in the operation or the subsequent care, viz.: first, the virulence of the infection; second, the quantity of the infecting medium, as extravasation from the bowel, or the amount of pus from a ruptured abscess; third, the resistance of the patient, a factor never to be overlooked and rarely to be correctly estimated; fourth, the activity of the organs of elimination, which, in many instances, can be fairly accurately determined and thus become a valuable aid in prognosis; fifth, the time at which the patient comes to operation after the poison enters the cavity; sixth, the dexterity and thoroughness of the surgical procedure, no matter the special method of the operator in attempting to reach the desired end. Of all the factors mentioned, only four come directly under the control of the surgeon. The amount of the poison may to some extent be lessened by early recognition and prompt interference. The time following infection, then, is of the greatest importance, and we can all agree that the sooner the operation is performed after the shock of a perforation is combated, the better the patient's chances, other things being equal. The power of elimination can be markedly stimulated and, therefore, is to some extent under the control of the surgeon. The sixth factor is also of great importance, and whatever the technique selected I should urge rapid but thorough work, with the minimum amount of traumatism.

In the technique again we find a wide difference of opinion. How is it possible to reconcile the claims of one school—Finney and others, who do not believe in irrigating the abdominal cavity, but rely upon sponging to take up the

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infectious material—with those of another school, who simply open and drain, doing nothing further; or with those of the third school—Deaver, Price, Blake, and others—who advise the free use of hot saline solutions? These views are apparently so very different that to reconcile them would seem impossible; yet the object of each is to free the patient of the noxious material and allow him to combat the poison already absorbed. By keeping this in mind, we can readily see that one operator reaches success by carefully sponging loop after loop of intestine and also the spaces where fluids are so prone to collect, while the other uses water to remove the pus and bacteria, believing that in this way he can best accomplish the end desired. Those who open the abdomen and drain without sponging or irrigation are evidently of the opinion that any further surgery in cases where this plan is used would be immediately fatal, and, therefore, hope to accomplish something from the incomplete surgery, thus making the best of a bad state of affairs.

It is scarcely my purpose to defend one plan of surgery and to decry another in these cases, believing that there are others here to-day who are specially equipped with facts to defend the positions which they have taken upon this subject. Yet I cannot refrain from a comparison of methods. Those who advocate sponging argue that irrigation tends to scatter the fluid containing the organisms and their toxins widely through the cavity, thus favoring further absorption, and to some extent this criticism is just, especially when the irrigation is incompletely done. I believe also that the toxins are likely to be absorbed more rapidly when diluted with water; so that this danger should always be borne in mind to urge us to be most thorough in this flushing. On the other hand, those who irrigate claim that, to obtain a perfect peritoneal toilet by sponging, it is necessary to subject the peritoneum to a great amount of trauma, thus adding greatly to the shock, and favoring the rapid passage into the blood not only of toxins, but of the organisms themselves.

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These are matters of judgment to be decided by the individual operator. Personally, I feel that I can cleanse an abdomen which is the seat of this form of inflammation better by flushing than in any other way, and have found that my more recent results are better than former ones, simply because I do my work in a more thorough and systematic manner.

I am no longer content to flush only the pelvis, a very satisfactory procedure after the enucleation of a tubal or ovarian abscess, but irrigate in each loin and under the liver as well. Often surprise has been expressed at the amount of pus brought out after a large quantity of clear fluid had returned from pelvic irrigation. It appears to me that we must give more attention in these cases to the condition of the lesser peritoneal cavity, which in some cases will require flushing and drainage. After the irrigation, a large gauze sponge should be used to take up the fluid remaining in the abdomen, and this step may be repeated just before the wound is closed. Some operators fill the abdomen with saline solution, but I think this of little benefit when a drain is used. We cannot claim that either sponging or irrigation renders the cavity absolutely sterile, as experiments upon animals have shown this to be impossible. Yet the amount and virulence of the infection may be so diminished that many of these patients recover. Drainage is almost universally used, although Blake concludes it is often unnecessary. It can do very little harm and may save life in some instances. A number of gauze drains surrounded by rubber may be inserted in the pelvis and other portions of the abdomen where fluid tends to collect, and a posterior drain may also be used. Glass or ordinary fenestrated rubber tubes are preferred by some to the use of gauze. I have had recovery in some cases in which a single gauze drain allowed the removal of only a small quantity of serum, and am therefore convinced that the result depends more upon the thorough manner in which the toilet is made and the lesions repaired than by any special form or number of drains. Some

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operators inject solution of sulphate of magnesia into the intestine during the operation and claim very beneficial results. The Fowler positions will be found useful in many of these cases. The patient should have the usual treatment given all abdominal cases, should be carefully stimulated, and should have no opiates unless demanded by great restlessness. My experience is that these patients do not fare so well with morphine as when it is not given. This impression may obtain because the more serious cases are the ones which demand morphine. If the patient ceases to vomit and the abdomen becomes flat I do not hasten to administer a purge, and when vomiting and distention persist purgation rarely relieves, although it deserves a trial. The convalescence may be interrupted by the formation of localized collections of pus, which must be evacuated and the cases conducted in accordance with general surgical principles. Cases in which the pus shows streptococci should receive the serum. Very little mention has been made of the septic form of peritonitis (acute peritoneal sepsis of Mayo Robson) because it can only be suspected from the extreme toxæmia, and is usually positively recognized only after the death of the patient. At its onset the pathology is identical with the suppurative form, and the only hope for the patient lies in the removal of the cause and the prevention of new infection by operation. The extreme gravity of such cases might tempt the surgeon to refuse operation, yet for the individual patient surgery is the only hope, and unless he is moribund should receive this chance.

In conclusion, these cases should be considered surgical with the two exceptions above mentioned. Operation should be done as a preventive measure before peritoneal infection and as soon after its occurrence as is possible, in some instances of prolonged shock before reaction is complete. The operation should be done as rapidly as is consistent with thoroughness, and above all things we would urge that incomplete surgery be not done. Each surgeon must deter-

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mine for himself how he can best free the peritoneum from infection, and he must realize that in the great majority of these cases the fate of the patient is determined when he leaves the table.

DISCUSSION.

DR. J. G. EARNEST, of Atlanta, Ga.—I would like to ask the experience of those gentlemen present in regard to the management of these cases by the serum treatment, and what they have gotten out of it. I have had very little experience with it myself, but have been in touch with two cases within a comparatively recent period. I have been familiar with the history and progress of those cases, although I did not see either one of them, in which the serum treatment seems to have cured a well-marked case of septic peritonitis. It has awakened with me a great deal of interest on this account. I have never used the serum treatment in any case of my own, and I rise simply to enquire about the experience of those gentlemen present with that method of treating streptococcus infection.

DR. W. P. CARR, of Washington, D. C.—There are so many different causes of general peritonitis that it is a little hard to classify the treatment of all of them under one head, or to adopt one kind of treatment for them all.

As regards the surgical treatment, the thing to do is to try to clean out the peritoneal cavity as well as possible, free it from infection, and do it with as little shock and as little traumatism to the patient as possible. When the condition of the patient will permit of it, a complete surgical operation ought to be done, and the abdomen thoroughly cleansed. But there are many cases of acute general peritonitis where the condition of the patient will not allow much operating, and where it is necessary to do whatever is going to be done in ten or fifteen minutes. The opening of an abscess cavity and cleansing it out is probably all that the condition of the patient will allow. The best way I have found to clean out an abscess cavity is by pouring into it a considerable quantity of peroxide of hydrogen. It makes a tremendous amount of foam, destroys pus in a short time, and does not do any harm. I have poured a pint of peroxide of hydrogen into the abdominal cavity on a number of occasions. It can be done quickly. You can get rid of pus quicker in this way than in any other manner with which I am familiar. After that, if possible, I like to flush out the peritoneal cavity with salt solution, and I think there is a good deal in the way that flushing is done. I take a large-sized rubber tube and irrigator and try to put it in the most remote regions of the abdomen, and let the water flow from the upper or farthest parts back toward the wound, washing out instead of spreading any of the infectious material

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that may be left there. Cases of general peritonitis that are operated on in that way, if they get well at all, get well without any trouble, almost as easily as cases of simple laparotomy without infection. I believe a great deal depends upon the kind of germ which has infected the peritoneum. There are many cases of general peritonitis that will not get well under any form of treatment whatever. There are instances in which thrombi have formed in the mesenteric veins, and where necrosis or gangrene of the different tissues in the abdominal cavity has taken place, which absolutely no treatment will save. There are other cases that are evidently produced by germs that are not so virulent in character; these patients make splendid recoveries after the abdominal cavity has been cleansed. I think it is a great advantage to leave the abdominal cavity full of salt solution and leave a drain in the wound. The salt solution drains through the gauze or drainage tube, whichever is used, bringing with it a good deal of possibly infectious material.

I want to say one word about the comfort of patients after operations of this kind. I think that the comfort of a patient, as well as the chance of recovery, is very much increased by keeping the bowels quiet, and, if necessary, giving him a certain amount of morphine. I do not hesitate to give hypodermics of morphine the first ten or twelve hours after a laparotomy. After that I do not like to do it.

Dr. William Edward McGuire, of Richmond, Va.—I consider this one of the most important subjects that can come before the Society, and I hope that this excellent paper of Dr. Sherrill will elicit a free discussion. I want to say that my experience with these cases has been most unfortunate until within a comparatively short period. Nearly all the cases of general suppurative peritonitis I have had have died, and I have come to the conclusion that I always did too much. I do just as little now as I possibly can in these cases. When I get hold of a case of suppurative peritonitis, with appendicitis, with the abdomen full of pus, I open the abdomen and insert a drain. I have stopped washing out the abdominal cavity, as I believe I have killed many patients by doing that. Dr. Murphy induced me to practise this method of treating these cases in a paper he read some time ago. I have had in the last six weeks three cases, and all of them got well. I never had such an experience as that before. I opened the abdomen and promptly passed a drainage tube into the pelvis and drained. Formerly, in these cases I made multiple incisions and drained different portions of the abdomen, after washing it out thoroughly, and they all died. I cannot recall but one or two cases that got well. I believe the whole thing in the treatment of these cases is to get into the abdomen quickly and to get out quickly and do as little as possible.

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This subject to me is one of the most important that I have ever had brought to my attention, and, as I have said, I was most unfortunate in my results under old methods of treatment, and when I used to read reports of a number of cases getting well I must admit that I did not believe the statements that were made, because all of my patients died who were treated in the same way. I used the exaggerated Fowler position. I set the patients up almost straight in bed. It does not do to lower the foot of the bed if you want to drain properly. There is about twelve inches of the abdominal cavity we want to drain, and unless you sit the patient up perfectly straight, almost, you cannot get into the abdominal cavity proper. Under that treatment I believe a large proportion of these cases will recover.

I hope some of the members, especially Drs. Murphy, Richardson, Finney, Mayo, and others, who have had a large experience in the treatment of these cases, will give us their views on this subject.

Dr. John B. Murphy, of Chicago, Ill.—I have been very much interested in this excellent paper, and desire to say a few words regarding the treatment of acute perforative or suppurative peritonitis, and I use the word perforative for a purpose. I do not include under the head general suppurative peritonitis that class of cases associated with appendicitis, circumscribed abscess, in which the seropurulent or purulent material fills the peritoneal cavity. I do not call these general suppurative perforative peritonitis, that is, a suppurative peritonitis which is not directly in communication with the intestinal tract, nor with the other mucous tract; so that I will not discuss that class of cases, because I believe that phase of the discusion is irrelevant. But I will speak of cases of acute perforative, suppurative peritonitis, in which there is a direct communication with the intestine, or perhaps a circumscribed appendical abscess which has ruptured into the free peritoneal cavity. In the management of this class of cases we have certain well-grounded surgical principles, which, in their application to the peritoneal cavity, have been overlooked, but are rarely overlooked so far as other infected areas are concerned. For instance, if we have a bone abscess, an osteomyelitis from acute infection, what is necessary to stop immediate absorption from that infection which is intoxicating the patient? Merely make a hole into the bone, tap it, and reduce the pressure; that is all. We do not have to scrape it; we do not have to wash it or sponge it. The principal thing is to remove the pressure caused by the pus. In what way does pus infection kill a patient? By furnishing the patient an excessive dose of the toxic material and giving that dose in a concentrated form. What can we do in the septic peritoneal cavity that will best stop the absorption of this infective material?

In the peritoneal cavity with pus infection, we have imme-

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diately after the dose is thrown in, so to speak, or immediately after perforation occurs, the element of depression with pain, nausea or vomiting, which come from the immediate primary irritation of the peritoneum, which is sometimes accompanied by depression, rather than elevation of temperature, and even by a lowering rather than an elevation of the pulse. After an hour, or many, depending upon the virulence of the infective material, one begins to have abrasion of the endothelium of the peritoneum or blistering with rapid absorption of the infective products, which tend to a fatal toxic termination. Can we lessen that absorption? Yes, we can lessen the absorption of infective material by the blistered peritoneum on the same principle that we can lessen the absorption of toxins in other infected areas of the body. What have we done in the past? We have opened the abdomen in these cases, taken out and handled the intestines, and we have mopped off the layers or flakes of protective lymph. We have poured peroxide of hydrogen into the cavity; we have put in salt solution by the bucket; we have packed in yards of irritating gauze and sponges; we have done many other irrational and unscientific things. I have tried all of them, and I have taken the opportunity of standing up and saying to bodies of medical men that I believed the great majority of such cases would die, no matter what I did for them. I want to take this occasion to apologize for having made that statement, and to say I was grossly in error. In the last three years I have had twenty-two consecutive cases of general suppurative perforative peritonitis, with one death. Included in these cases were perforations of the stomach, the duodenum, the intestine, typhoid perforation, ruptured periappendical abscess, etc., yet only one death. Why do these patients live now and why did they die before? I do not know, but they do live. I have no "life-saving stitch;" I have nothing to offer you specially that will make them get well, except it be following a routine treatment which I do now, which is materially different from what I practised before. If the essayist finds that all these patients get well from washing out the abdomen, I would not recommend him to change his method in his work. I know that with the plan which I am following now these cases are getting well. My fatal case was one of general suppurative peritonitis from periappendicular abscess. The patient contracted a double pneumonia on the sixth day, when the peritonitis had completely subsided, and died from it.

In this discussion we have to consider the question, What can we do to lessen the immediate absorption? *a*. Open the abdomen. *b*. Shut off the source of supply of the infective material, whether that be a perforated stomach, a perforated duodenum, a perforated intestine, or appendix. *c*. Do the least possible manipulation in the abdomen, the same as we do in a phlegmon

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of the thigh. *d*. Put in a drainage tube. *e*. Put the patient in a sitting (Fowler) position, to allow the infective material to escape into the pelvis and prevent it from being retained under pressure. The pressure element is a most important one, but it is not the sole element. *f*. Empty bowel and stomach by sewage. *g*. Give one and a half pints of nominal salt solution every two hours. *h*. If advanced toxic condition, give 20 c.c. Sterns' antistreptococcus serum at one dose.

The gentleman who opened the discussion referred to another class of cases; namely, those in which there is streptococcus infection. I saw degrees of streptococcus infection formerly which I do not see now. I saw cases formerly in which it seems to me under the present treatment the patients would die. Those were what we might call cases of acute malignant streptococcus infection. They die from the rapid production and rapid absorption of the infective material. It is surprising to note the rapidity with which this infection enters the lymph circulation; this is not true of staphylococcus infection; the latter occurs with greater frequency in the peritoneal cavity. If I have treated the number of cases mentioned—twenty-three—in the last three years since I have adopted the plan referred to, with only one death, what does it show? That the number of malignant cases of streptococcus infection of the peritoneum at the present time is comparatively small, and if we can get results so favorable from such a plan of treatment, we ought to pursue that method and be satisfied without theorizing as to why we get such results.

(At this juncture the President called Dr Murphy's attention to the fact that time was up, and, on motion, Dr. Murphy's time was extended, and he continued the discussion.)

The details of treatment vary in cases of perforative peritonitis. If it be the stomach that is involved, an incision is made directly over it, and the perforation closed by two or three rows of linen sutures. If it be the duodenum, a similar plan of treatment is carried out. Immediately after closing the incision at the upper part of the abdomen down to the small drain placed there, a puncture is made through the rectus muscle, either the right or left, just above the symphysis pubes, and two large drainage tubes are passed into the most dependent portion of the pelvis. No effort is made to flush or sponge out the abdomen. The patient is put in the exaggerated Fowler position. The treatment from this time is very important. In the first place they are either well on the way to recovery, or death will result within the first twenty-four hours after the operation. Then the question arises, Can you dilute the toxins or administer antibodies for the first forty-eight hours? In many cases I have observed the advantage in the use of antistreptococcic serum of Sterns. It does not seem to counteract the immediate

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toxic symptoms. In the second place, we should fill the large intestine with normal salt solution. I give patients as much as a pint and a half of saline per rectum every two hours. They get on an average of eighteen pints of salt solution in twenty-four hours. They absorb it all. They are not given anything by mouth, because the majority of them vomit after operation, and the stomach does not absorb water. We give strychnine, which is practically the only medicine administered. A large quantity of salt solution administered continuously by rectum dilutes the sepsis sufficiently to tide them over until their local immunity (tissue infiltration) is greatly increased. The infiltration of the tissues of the peritoneum which has been overpowered in the beginning undergoes such a change as to resist absorption (local immunity); this, together with the general leukocytosis, is so great as to overpower the sepsis and carry the patient over the dangerous first twenty-four hours, so that he can go on to recovery without interruption. Elimination equals absorption from that time, and the patient needs but little attention.

DR. MURPHY (closing).—I have nothing additional to offer. I desire to thank the members very much for the additional points they have brought out in the discussion, and for their liberal treatment of the subject.

DR. J. M. T. FINNEY, of Baltimore, Md.—This is a very important subject, indeed, and, following the example set by Dr. Murphy, I owe the Association an apology, since my name has been mentioned by the author of the paper as advocating some years ago scrubbing of the intestinal coils in cases of this sort. A wider experience, however, has taught me that that method was entirely wrong, and I want to beg the forgiveness of the Association for having at one time advocated it.

I agree most heartily with the words of the preceding speaker and with the suggestions of the reader of the paper. It seems to me that the least we can do that is effective is the best that we can do in these cases. I have come to divide very widely cases of peritonitis into two large groups—those in which there is a single pus cavity, and those in which there are multiple cavities. In those cases in which there is a single collection, whether it be in the right iliac region or in the pelvis, or whether it includes the whole peritoneal cavity or not, we can give, in the vast majority of cases, a fair prognosis. These cases will frequently recover if too much is not done. The grave cases are those in which there are multiple abscess cavities, where we may have one cavity in the pelvis and another higher up. In these, in my experience, the prognosis is always grave, no matter what method of treatment is pursued. It has been my custom recently, following just along the line Dr. Murphy has suggested, to find, as quickly as possible, the cavity, to drain it by just as little manipulation as possible, and stop right there, except in those

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cases where there is much distention of the intestine. Where there is much distention of the intestine, where one drains the outside of the bowel, he has only done one-half, but when, in addition, you drain the inside of the bowel, you have put the patient in a very much better condition to recover. We all know that there is a tremendous absorption from the intestinal canal. Dr. Murphy has combated that successfully by giving large quantities of saline solution. But sometimes we will find that the rectum is intolerant of this solution, as well as the stomach. In such a case we can resort to intravenous injection or subcutaneous infusion of salt solution. But, in addition to that, it has been my custom recently, if I do not make a fecal fistula at the time, to put a thread through the wall of a loop of bowel, and leave it in temporarily, taking that as my guide, if it subsequently becomes necessary to make a fecal fistula.

I want, again, to emphasize a point that has been made by several, as well as by the reader of the paper. I confess that I have probably injured a number of patients by meddlesome surgery, by doing too much. It was ignorantly done, of course. I feel that the tendency on the part of most of us is to err by doing too much rather than too little, and we should content ourselves with the least possible manipulation, and whatever manipulation one does, he should do it inside the abdominal cavity.

Dr. Charles H. Mayo, of Rochester, Minn.—This is a most interesting subject to me, and particularly that phase of it dealing with infective peritonitis due to rupture. As to the question of determining the severity of cases of general peritonitis, I have had the feeling that any case which recovers should not have been called general peritonitis. We should say, at least, in the cases that recover that a diffuse peritonitis may have occurred. But we have an unknown condition. When we consider that the area of peritoneum involved is almost equal to the area of skin covering the body, and that we have an irritative peritonitis of that large area, we can readily understand that it is almost equivalent to an extensive burn involving the entire skin of the body. We know that when we have such an extensive burn of the body it is likely to result in death. And here, when we have an infective process which takes in the entire abdomen, all the crevices in the intestine, the lesser cavity of the peritoneum, etc., we are just as likely to have death as if the whole surface of the body had been burned.

As to drainage in these cases, we drain with the patient not only in the Fowler position, but in an exaggerated position.

As to irrigation, we do not irrigate anything which is derived from the tissues of the body. Take an abscess, for instance, which is formed from the tissues of the body, we do not irrigate it. We let the secretions take care of themselves by drainage.

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If we have a gunshot wound of the abdomen, with perforation, which has driven foreign bodies into the abdominal cavity, it is best to clean out that cavity. But if the secretions have been derived entirely from the tissues or blood serum, we do not think irrigation is especially advantageous for that particular case. It is very rarely, if the patient is very sick, that we do much more than resort to the drainage which is necessary to save life, doing very little for the original condition. In cases of rupture of the appendix, if we can establish efficient drainage, without doing anything to the appendix, and attend to that as a secondary matter, I believe in some we could save life.

Dr. Maurice H. Richardson, of Boston, Mass.—I did not intend to speak on this subject, but one or two things have been said which are especially interesting to me.

In general peritonitis the difficulty in drainage is due partly to the great extent and complicated folds of the peritoneum, from which it is impossible by any force to remove effectively the products of bacterial growth. It is due in part also to the necessity of up-hill drainage, which can be accomplished only by capillary attraction by means of gauze or by gravitation by means of posture. In all methods the area drained is in a very few hours limited by adhesions to the parts in direct contact with the means used, whether tubes or wicks. I am more and more convinced by additional experience that the fatal results in peritonitis depend more on the virulence of the infecting germ than any other one thing.

I am glad to hear that most of the speakers are practically in accord with the view that as little handling of the intestines as possible should be permitted at the time of operation; that the focus of infection, wherever it may be, should be as quickly removed as possible, and that as little washing out, as little wiping, and as little general manipulation as possible should be done.

I am sorry to say that I look upon general diffuse peritonitis with almost as much discouragement to-day as I ever did; and that if a patient recovers, it is because the infection is a mild one, as Dr. Finney has said, and the germ one which in itself is not essentially fatal. Indeed, I cannot but look upon the recovery of a patient from apparent advanced general peritonitis as throwing some doubt at least on the diagnosis. I know many cases are called general peritonitis which should not be called such. It is probably all a matter of definition. If we should meet at the operating table in a case of general peritoneal infection, and if we could there define what a general peritoneal involvement is and what it is not, we could then talk intelligently as to the prognosis and treatment. Recoveries are more frequent to-day because operations, as a rule, are performed earlier, and not because methods are any more scientific or any

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more thorough. When I see a patient with a distended abdomen, with paralyzed intestines, with vomiting, and with a systemic toxæmia, I have very little faith in the recovery, no matter what I do. Even when the focus of infection is removed, when dependent drainage is used by making incisions in each flank, and after establishing with gauze wicks capillary drainage, I regret to say that in my own cases, as well as in the cases of others which I have personally observed, the outlook is as bad as ever. I am, nevertheless, sometimes surprised to see patients now and then recovering under most adverse symptoms.

This discussion seems to me extremely interesting and valuable; but my experience has been so discouraging that I cannot expect recovery in any case of general advanced peritoneal infection. I have for a long time carried out a routine very similar to that which has been here described, although I have not made use of postural treatment. I have used multiple dependent drainage; I have used drainage of the intestine by enterostomies; and I have used irrigation. The result, however, remains just the same. I shall welcome any advance or any method which will give us hope in advanced general peritonitis. I can say, however, that in acute appendicitis, even with beginning general infection, my results have vastly improved over those of ten years ago. This is because I am able to operate much earlier than I did. The physicians and the people of the community in which I live are educated to the necessity of the earliest possible operation. I am able, therefore, to operate within a few hours after the initial pain, when even in general peritoneal infections there is a strong probability of effective drainage. In appendicitis, the commonest cause of general peritonitis, here is in many cases a general peritoneal exudate. No man can tell at the time of operation whether that free exudate is infected or not; whether it is serum containing the streptococcus, the staphylococcus, or any other pus-producing organism. There is in the beginning always a certain amount of exudate. That exudate is very largely absorbed during the operation of removing the appendix by the masses of walling-off gauze which become saturated with it. After operation for a number of hours most of the remaining fluid is sucked out by means of gauze wicks. I no longer use tubes, but always wicks of gauze. Finally, I would say that general septic suppurative peritonitis is, in my experience at least, essentially the same fatal disease to-day that it always has been, and, I fear, always will be.

Dr. Earnest.—I understood Dr. Murphy to say that in his last series of twenty-one cases in which he had but one death he used the serum treatment. I would like to ask him in what percentage of them he used the serum treatment along with the other treatment, and if any benefit was derived from the use of the serum? In the treatment of these cases we are

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grasping at straws, so to speak, and if we can get help from the antistreptococcic serum, it is well to use it in appropriate cases.

DR. MURPHY.—In reply to the question of Dr. Earnest, I would say that I cannot give the percentage of cases in which the serum was used without looking up my records. However, there is a special indication for the use of the serum. In those patients who have a severe intoxication from the products of infection, the serum is of the utmost importance. I believe the serum had some effect in the acute intoxication cases, and they came nearer the type of streptococcus infection.

DR. W. D. HAGGARD, of Nashville, Tenn.—Although a good deal has been said with reference to abandoning irrigation, we still have the conviction that it is very essential in some cases. We might with profit recall one instance in which irrigation is and always will be proper, as, for instance, in a case of gunshot or perforation of the duodenum, the stomach, or intestine. In such a case, where the contents of the alimentary canal have escaped into the cavity, if we can wash it out right away, there does not seem to me to be any objection to irrigation. If we see a patient after an overdose of laudanum has been taken, we wash out the stomach and get rid of the poison at once. If the patient is not seen until some hours afterward, when absorption has already taken place, it can do little or no good. So in advanced cases of peritonitis of the type Dr. Murphy has in mind, and to which Dr. Mayo alluded, irrigation should not be practised at that time. That little simile has been a sort of guide-post to me, a finger-pointer, so to speak, to tell me just when and when not to irrigate in cases of generalized peritonitis.

DR. CHARLES L. BONIFIELD, of Cincinnati, Ohio.—I would like to say a few words in reference to the series of cases reported by Dr. Murphy. As I listened to the report I felt very grateful to Dr. Murphy for giving us a ray of hope for better results in the treatment of this most fatal class of cases. But before the doctor took his seat he made one remark that put a damper on my enthusiasm. It was that recently he had not had the same number of cases of streptococcus infections that he formerly had. To my mind, this accounts for the favorable results he has had to a greater extent than does his change of treatment. The doctor has had a fortunate run of cases.

We all know that in our surgical work certain cases come in flocks. A man who is doing abdominal surgery will one week get a number of cases of fibroids, the next week pus tubes, and the next week a run of appendicitis cases, and, it seems to me, although Dr. Murphy's cases have extended over a considerable time, there must have been a little good luck in getting cases that did not have streptococcus infection.

As surely as the doctor continues to practise surgery, he will

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again get cases where the streptococcus is the infectious germ, and then his results will not be so gratifying.

I am glad to hear Dr. Murphy say that he found one make of serum that was reliable. In my limited experience with the antistreptococcic serum, I have gotten excellent results once in a while, but in a great majority of cases none that I was able to discover.

Dr. Sherrill (closing).—First, I wish to thank the members for their free discussion of my paper. The principal object I had in view in writing and reading this paper was to elicit a free discussion, a desire to get an expression of opinion from the members, and I am only sorry that they did not touch upon the treatment of those cases in which surgery is not allowed. I believe we can do more in the prevention of this condition than we can in its cure, and that in perforative cases we ought always to invade early; first, because, as has been stated by several speakers, much depends upon the virulence of the intoxication, and, second, upon the diminished resistance of the patient. We will find some patients who will die under any plan of treatment we may employ.

I think we agree with Dr. Murphy that if a certain practitioner is getting favorable results from a certain plan of treatment it is well to adhere to that plan, regardless of what anybody may say. My experience has not been so fortunate as that of Dr. Murphy. I have had several cases within the past two years. Of this number I have lost two. In one case that died I removed the appendix and drained. I saw the case four hours after the rupture of an appendical abscess, which was attended by severe pain and syncope, and I was fully satisfied that the large amount of pus could not have accumulated in six hours. This case was treated precisely the same as were those that recovered. I feel that there must have been a great difference in the resistance of the patients, as well as in the character of the poison and the quantity of it. Stress should be laid on this point.

I cannot agree quite with the statement of Dr. Murphy that the peritoneum is identically the same as bone, and that suppuration in the peritoneal cavity is very much like suppuration in a bone cavity, for the reason that free pus in the peritoneal cavity is not pus under tension. In bone we have suppuration which is under tension, and by simply draining in most cases relief is afforded. The peritoneum is somewhat similar to the knee-joint, in that it has a number of places where pus can accumulate, and frequently the products of the suppuration are absorbed by the lymphatic vessels as well as by the bloodvessels. Therefore, I feel much safer when I have removed toxic material from the pelvis and from all parts of the intestines where it is found.

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I agree with Dr. Brown, because I have had several cases in which, after washing out and believing I had done complete work, I have found several pockets not walled off, but free, simply held by the position of the intestine, and when drained, the patients have gotten well. It is not so much what we do in these cases as it is the thorough manner we deal with them and the rapidity with which the work is done.

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SOME FURTHER ADVANCES IN RENAL SURGERY.

By John B. Murphy, A.M., M.D.,
Chicago, Ill.

In the future we must consider the surgery of the kidney from an entirely different standpoint from that of the past. We must consider the kidney as made up of the cortical or excreting tissue and the pelvis, with its essential adjunct, the ureter, and in the management of lesions which involve the kidney we must take into consideration the preservation of any portion of the excreting tissue of that organ which is still in a condition to functionate. This is demanded on account of the enormous mortality that is associated with the removal of the entire, normally excreting kidney. Statistics show that the removal of a kidney that is excreting practically its normal amount of urine has been attended with a mortality of from 29 to 39 per cent.

Let us consider the management of the class of cases in which there is still nearly a normally secreting urinary surface. How can we best operate on such cases to avoid mortality and retain such an essential organ as the kidney when only the renal pelvis or ureter is the seat of disease? In connection with this work, in which I have been particularly interested, we have divided the cases into two classes so far as the location of the disease in the collector and conducting tube is concerned, namely, those in which the upper portion of the ureter and renal pelvis is involved, and those in which the lower portion of the ureter is implicated. We subdivide the first class into (*a*) those in which the pelvis alone is

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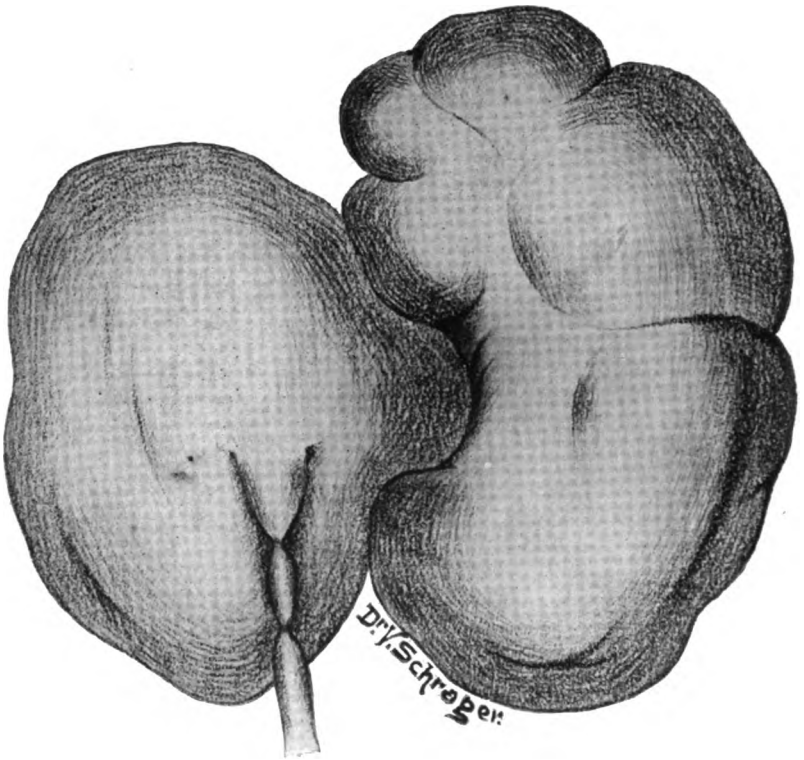
FIG. 1



Cystic pelvis; upper part of kidney cystic. Ureter: two constrictions.

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dilated, and (*b*) those in which the renal tissue, the pelvis of the kidney, and the calices are enormously dilated, even to the degree of compression and absorption of the cortical portion.

In acute, non-infective cases the weakest point of resistance is the pelvis of the kidney, and we have a slow dilatation, with some absorption. In this class of cases, too (as when an irregularity in the degree of resistance has developed in the expansion of any cavity), we have the expansion always advancing in the direction of least resistance—in the direction of the pelvis. If the resistance be uniform, as it frequently is in children, where there is a congenital partial occlusion of the renal end of the ureter, there is a gradual expansion, not of the pelvis alone, but also of the calices, and finally complete destruction of the secreting renal tissue, as will be shown in Case VI. of this series.

In the last three years I have had 6 of these cases, 5 of the acutely dilated type and 1 of gradual dilatation. In the 5 acute cases the histories show that the obstruction was of short duration—four years the longest. All were associated with a mild hæmatogenous infection. In the other type—*i. e.*, of ascending infections (not hæmatogenous)—we have entirely different pathogenic factors, which cause the destruction and absorption of the secreting portion of the kidney itself. In these acute infections we do not have a rapid destruction of the pelvis of the kidney, because the pelvis is made up of a mucosa and a submucous connective-tissue support which yields slowly to infection. In this class we have a rapid destruction of the cortical secreting portion, with small abscesses and areas of necrosis. These cases go on either to complete destruction of the secreting tissue of the kidney or to a rapidly fatal termination, and many of them die shortly after the infection begins. This type is almost always in males.

In the other sex we find most frequently the hæmatog-

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enous type of infection, of which I have had 5 cases. In them we have a history extending over a period of years, with vague symptoms and only little urinary disturbance. Three of these 5 cases had been operated for appendicitis, and in another a diagnosis of appendicitis had been made. The fifth patient had a left-sided renal obstruction. This shows how closely, in their clinical histories at least, the cases resemble appendicitis, and emphasizes a point that will be brought out more forcefully in a subsequent paper, namely, the importance of a careful examination of the urine in females, as they are more liable to this type of trouble than males, and their urinary irritations are given less attention.

Atypical as these cases are, if the urine be carefully examined in all doubtful cases of recurrent appendicitis before any operative intervention is advised, error can readily be avoided. In all forms of obstruction it is difficult to differentiate between cicatricial stenosis of the ureter close to the kidney and pelvic calculus. In each of the 5 cases of subacute dilatation there were pus and blood cells in the urine on microscopic examination, and the blood was increased immediately after each attack. In each of the cases the probability of a renal calculus as a cause of the obstruction was considered. However, in obstruction from calculus we are less likely to have so great an enlargement of the kidney as with cicatricial ureteral occlusion. In obstruction from calculus we more frequently have acute manifestations of infection, because there is always an abraded surface in the pelvis of the kidney, which forms an atrium for bacterial invasion. Irritation of the pelvis of the kidney favors the localization of hæmatogenous infection. In the patients who passed through attacks while in the hospital, elevation of temperature was a regular occurrence. Pus was present in all; in some large quantities were passed during an attack. The question for consideration was, What disposition should be made of the kidney after it was exposed? The enlarged pelvis was almost equivalent in size to and in some cases

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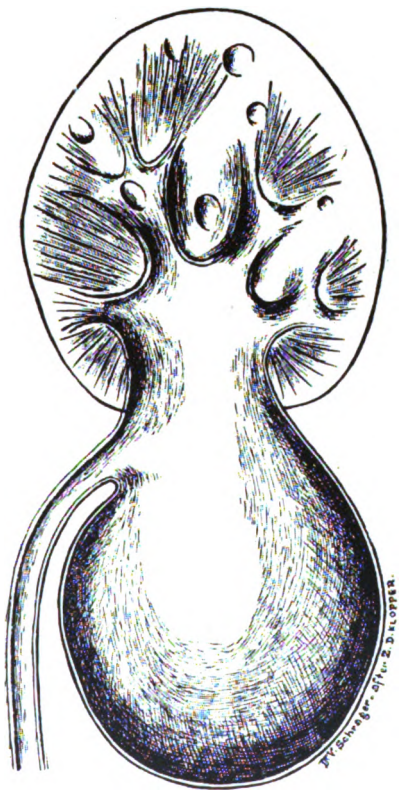
Fig. 2



Cyst of pelvis exposed. Section.

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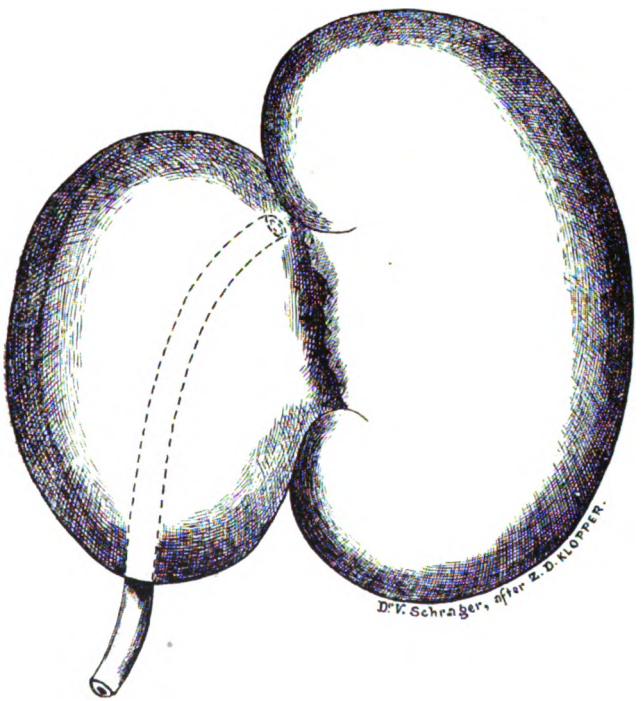
FIG. 3



Showing the line of the ureter along the wall of cyst.

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larger than the kidney itself. In these cases of dilatation of the pelvis it was formerly my custom to remove the entire kidney, until I realized that there were some practically normal secreting kidneys with pelvic dilatations. There was ureteral entrance obstruction in these cases, and as the kidney was doing practically its customary work there was no reason whatever for removing the kidney, when the sac could be resected regardless of the position of attachment of the ureter to the sac. This attachment varied in every case.

In the sixth and last case—a little girl of fourteen—the patient had a history of pressure in her right side, dating from early childhood. In this case there was no infection and no blood or pus in the urine. There was nothing to indicate that the kidney was the cause of the trouble, except the presence of a large tumor under the right costal arch, which extended beyond the middle line. On account of the slowness of growth and absence of infection the patient was free from pain. As the tumor became larger it was merely a smooth sac with an almond-shaped elevated portion of tissue not more than one-third of an inch in thickness, which represented the renal substance remaining unabsorbed. It was no longer performing its function of secreting urine. The epithelial cells had lost their columnar shape; they were flattened out and secreted a clear fluid resembling serum.

After exposing the lining of the cyst, and determining that practically no kidney structure was left, it was decided to remove the kidney in its entirety, or, better, to remove the sac. In that case I encountered the greatest difficulty, as the sac had burrowed behind the renal vessels and vena cava to the central line. In the enucleation of the sac, which had become firmly adherent to the vena cava, I tore the latter in separating it. This occurred when I had the vena cava in my hand and I therefore recognized it. It was not such a serious matter, however, as the tear was readily closed with a continuous suture and gave no subsequent trouble. I

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call your attention particularly to this case because the sac burrowed so far beneath the vessel centrally.

Of the other class of cases, with dilatation of the pelvis, the first was to me purely experimental as regards the operative treatment. I believed that the kidney was secreting its full amount of urine and that possibly I could conserve it by dissecting away the entire pelvis (pyelectomy), except the point of attachment of the ureter. The point of attachment of the ureter was well up and to the side of the upper pole, close to the cortical portion. After opening the sac of the pelvis and dissecting it out, the ureter was slit the entire length of the opening in the pelvis. At the lower angle a V-shaped piece of the sac was twisted into the extended slit in the ureter, making a funnel communication between the lower portion of the remaining part of the pelvis and the ureter. This gave a larger exit at its mouth, as shown in the accompanying cut. I then spread the ureter over on to the open pelvis of the kidney and united it by suture to the margin of the elongated pelvis for fully two inches.

This type of dilatation of the renal pelvis occurs behind the vessel and downward in the direction of the ureter. In the operation above described the sac was readily separated from its attachment to the vessel, and the ureter approximated the cut edges of the pelvis by catgut suture. It has been a great surprise to me, and an agreeable one I may add, to note how readily the ureter unites. I think the peritoneum is the only tissue that unites as readily as the ureter. In one case in which I excised the entire pelvis of the kidney (pyelectomy), I inserted a large drain through the cortical portion and left it in until the twelfth day, at the end of which time I removed it. The urine ceased to come through the drainage opening twelve hours after the tube was removed, and it remained permanently closed, showing how perfectly the newly attached ureter took on the work.

Again, in all of the cases I have found that the source of the

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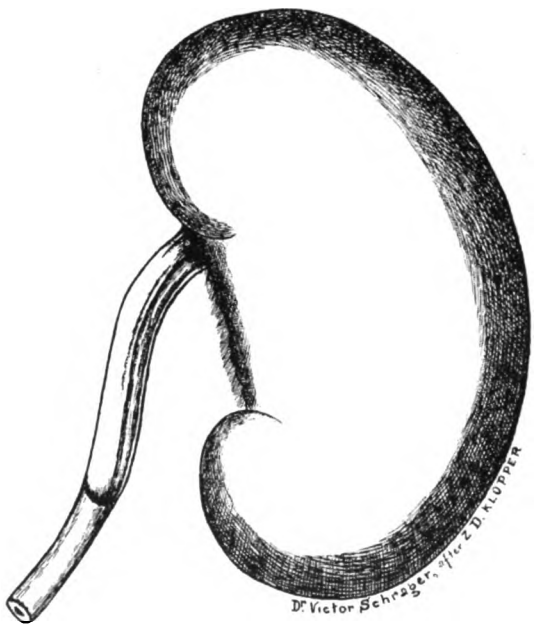
Fig. 4



Split in the ureter and pelvis.

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trouble was stricture of the ureter in its pelvic end. There was very little fibrous deposit, but sufficient, with the deflected attachment to the pelvis, to produce an occlusion, retention, and gradual dilatation, and to cause repeated attacks of complete occlusion. When I tell you that every one of the right-sided cases were diagnosed as recurrent appendicitis you will realize that the symptoms must have been very pronounced to have led to that diagnosis. Three of them were operated on for appendicitis, showing how severe the attacks were. In two of the three operated upon for appendicitis the patients had a symptom which was not present in the other—*i. e.*, elevation of temperature—an element that might be misleading. The leukocyte count was of no differential value because there was an acute absorptive condition. The differential diagnosis is difficult when the urine is not carefully examined, and when the abdomen and kidneys cannot be palpated in the acute attack. There is one sign that assists us in making a differential localization of vague conditions in the abdomen and pelvis, and that is the sensitiveness to pressure during the acute exacerbations.

In resections and reformations of the pelvis of the kidney I have been unable to follow any uniform type of operation or method, as the mechanical conditions were so varied. I simply cut off the excessive amount of tissue down to the cortical margin of the pelvis, and if the ureter is attached below I free it for a considerable distance downward, displace it upward, and apply it as in a flap type of operation, assuring myself that the opening in the ureter extends well below the lower portion of the pelvis. If necessary to ensure this, I twist a V-shaped flap from the pelvis into the slit of the ureter. This procedure constitutes a pyelectomy with ureteroplasty.

Let me here refer to a class of cases in which a cyst involves one pole of the kidney. In this class also it had been our custom to remove the kidney. There is, however, no

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definite indication for its removal; it can be partially resected. The kidney when partially amputated bleeds profusely for a few minutes only, after which the hemorrhage subsides, as the kidney tissue has hæmostatic properties similar to, though weaker, than the adrenal tissue. There is still another class of cases, those with a large stone in the renal pelvis and an enormous enlargement of the pelvis with sacculation. In these I make a careful dissection of the excessive tissue of the pelvis and endeavor to reduce the sac to about the normal size of the upper portion of the ureter and pelvis before closing it with catgut suture. No cavity is left in which a calculus might reform or infective material accumulate. Furthermore, in order to guard against the formation of a valve, which might cause obstruction, a resection of the pelvis is made. I had one extreme case of this class which healed by primary intention.

I believe that the surgery of the kidney has attained a stage of development that demands a careful and cautious examination of the organ at operation to determine (as in certain lesions of the stomach) whether this or that portion of the kidney can and should be removed and the remaining portion husbanded.

In my cases the difficulty of making a resection was not great with one exception, and that was in Case IV. The patient was a boy, aged sixteen years, who weighed 235 pounds. It was like working in a well. I succeeded in keeping the abdomen elevated by having an assistant place his shoulder against it from the under side, so that the kidney could be brought near enough to the surface to make a resection and approximation. He left the hospital three weeks and two days after the operation with complete restoration of the ureter, and without the slightest pain or symptom of retention, which had annoyed him for years. The wound was entirely closed.

I have brought this subject before you, gentlemen, as a contribution to the conservative management of upper

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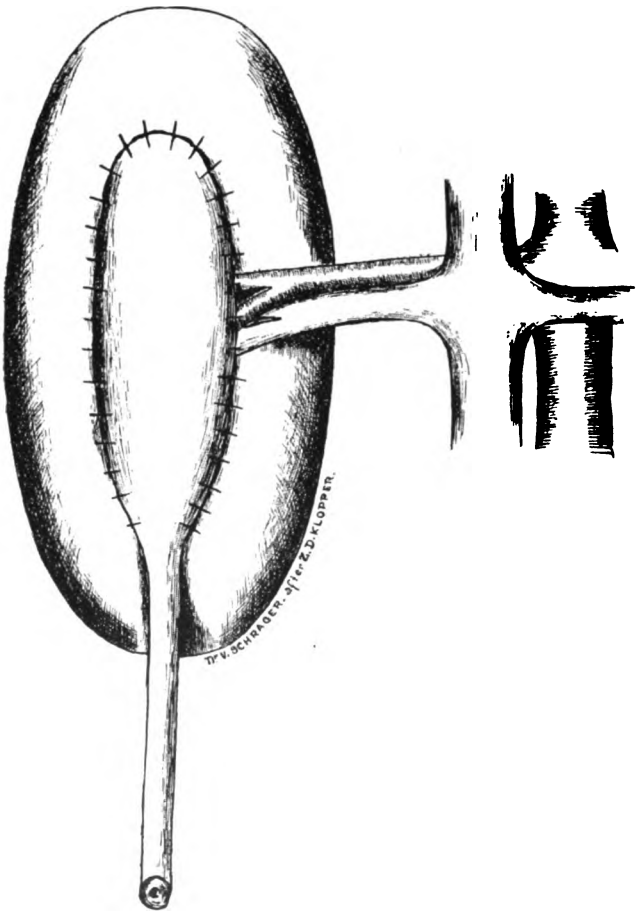
FIG. 5



Plastic attachment of ureter to floor of pelvis.

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obstructions of the ureter and secondary pelvic cystic dilatations

The histories of these cases will follow in an article covering the entire field of surgery of the urinary tract. The first operation was performed October 1, 1902, and the last one October 19, 1904.

DISCUSSION.

Dr. Charles H. Mayo, of Rochester, Minn.—I have been very much interested in the paper presented by Dr. Murphy, as I presume most of the members have, and I feel that I was fortunate in having seen the doctor operate on two of the cases which he described of resecting the pelvis of the kidney. It was quite a simple procedure, and showed that it is possible nowadays to get the kidney up into the operative field, so that the operation can be done almost outside of the body. As Dr. Murphy said, in one case he had considerable difficulty, and I think occasionally that is true. It is true often enough to render surgical work on the kidney a matter of doubt, as it is impossible to tell beforehand the kidney that will come up easily. One sometimes strikes an exceedingly difficult case.

Dr. Murphy brought up the point of conservative surgical work on a kidney in which only one-third or one-half of its structure was working. It seems a peculiar fact, yet is nevertheless true, that where we have two organs of a similar character, the amount of risk in the removal of one of them depends upon the amount or extent of disease. Where we have two structures or organs, as, for instance, two lungs, we can lose one lung if it is out of commission by an operation which makes no trouble. So, too, if we have two kidneys and one becomes diseased, its removal does not entail much risk. Any structure which nature has put out of commission, like a gall-bladder, filled with pus, and has not been working as a gall-bladder for an unknown time, can be removed without detriment to the economy.

Dr. J. Wesley Bovee, of Washington, D. C.—There are two conditions for which we are justified in removing a kidney —malignant tumors and tuberculosis, or where there is no involvement of the opposite kidney in some cases of advanced disease, as obstruction from pressure, the formation of pus or pent-up urine. But I think in practically every case, where a patient is not endangered by leaving the kidney behind, we are not justified in removing it until it has been found incompetent by cryoscopy or other methods of examination of the urine. I believe the urine of each kidney should be examined separately

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and until this is done we are not in a position to know whether the remaining kidney will be able to perform the function of both kidneys. Where one kidney is destroyed, the kidney of the other side must assume the additional work and carry it on satisfactorily. But it does not do this at all times, and we make a mistake if we remove one when it is functionating and the other kidney is absolutely crippled. In the case of a very abnormal spleen, we know we can remove that organ with a great deal more safety as regards the after-effects upon the individual than we can when it is nearly normal, and the same holds good regarding the kidney.

There is one difficulty in connection with plastic work upon the upper portion of the ureters and pelvis, and that is the danger, when the kidney goes back into the retroperitoneal space after operation, that it does not take the position we fancied it might—a position in which it will drain nicely. It is exceedingly important in these cases, where there is an obstruction to the upper course of the ureter, perhaps a valve-like constriction, to make a large passage where the constriction was by the method of Heineke-Mikulicz, and the plastic of Küster and Fenger, but we must ensure that drainage of the pelvic opening is in the proper position. I can confirm what Dr. Murphy has said in regard to rapid healing of the ureter after these operations. I have not drained through the kidney as Dr. Murphy has suggested, but have trusted to this tendency of the ureter to prompt healing after operation.

Dr. Mack Rogers, of Birmingham, Ala.—I rise to thank Dr. Murphy most heartily for this excellent exposition of this subject, which to me, I confess, is a revelation.

Some of you will remember that I presented a specimen at the last meeting of our State Medical Association, which confirms the first type of cases that the doctor described, namely, a beginning dilatation in the pelvis extending to the secreting portion of the organ, and completely obliterating the secretory portion. This case occurred in a young man, aged eighteen years, who did not give any signs or symptoms of trouble until a short time before. He came to me complaining of symptoms resembling very closely those of typhoid fever. I did not commit myself to a diagnosis. I ordered him to bed, and had that reservation in my mind. A few days later, the fever continuing, he developed tenderness in the loin. I operated, finding that the kidney had perforated. The constriction was sufficient to dam back the urine to such an extent as to cause perforation of the kidney substance. The urine came out from the lumbar incision, as soon as I was through the fascia, in great abundance, and, on removing the organ, it was found to be completely destroyed by this process of dilatation. In other words, the urine was dammed back; pressure was great; both cortical and medullary portions had been destroyed, and there was nothing

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but the capsule to indicate the former organ. As I have said, I reported this case at that meeting, not being aware of the condition which Dr. Murphy has so ably described, and for which I thank him most heartily.

Dr. Hugh H. Young, of Baltimore, Md.—I congratulate Dr. Murphy on his interesting paper. We are all greatly interested in the future of kidney surgery, and I think we agree with him that it has become very much more conservative in a certain way, and more radical in another. In hydronephrosis and nephrolithiasis we are much more conservative now than formerly, while in tuberculosis we are very much more radical. We all agree now that often in a non-tuberculous condition we can preserve the kidney and ureter, even though badly diseased, and still have an organ which is of considerable value in the future. On the other hand, we feel pretty strongly that if it is tuberculosis, along with the kidney, the ureter should be removed right down to its junction with the bladder.

The cases cited by Dr. Murphy are very interesting, and he is certainly to be congratulated on the results he has obtained. I think, however, a great deal of the plastic work which has been done upon the pelvis of the kidney is unnecessary; that the pelvis of the kidney is very much like a dilated bladder, in that if you remove all obstruction and afford a free exit for the urine, the dilated organ will return to normal size. It is rarely necessary to take up the redundant dilated pelvis, because if you remove the obstruction below, that will take care of itself. I feel confident of that, from several cases in which I found the ureter enlarged to the size of the thumb, and the pelvis greatly dilated, with strictures or incarcerated stones below, which have remained perfectly well after remedying the stricture in the lower portion of the ureter.

I agree with Dr. Murphy in the feasibility of suturing the ureter. It is an easy thing to do, and sutures, as a rule, hold. I think this is due to several causes. First, because in these pathological conditions the ureter is dilated, greatly thickened, and holds sutures better than it would in normal state. That the constant irritation produced by stone has brought about a considerable hyperæmia, and the ureter is much better supplied with bloodvessels than normally, and is, therefore, in an excellent condition for wound healing. In a recent case I removed a stone, the length and size of my index finger, from the left ureter, and had to suture the ureter for a distance of 7 cm. or 8 cm. The wound healed completely without any leakage.

One of the interesting problems of ureteral surgery concerns the lower end of the ureter. My experience in the last three years has shown that the entire urinary tract is just as amenable to surgical treatment as the kidney itself, and there are no portions of the ureter which are not easy to reach through a simple extraperitoneal incision.

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THE OPERATIVE TREATMENT OF VESICAL DIVERTICULA, WITH REPORT OF FOUR CASES.

By Hugh H. Young, M.D.,
Baltimore, Md.

The frequent existence of vesical diverticula is one of the early and interesting facts that are shown to the young cystoscopist. He is at first charmed with the beauty of the picture and soon learns to gauge the extent of obstruction to free urination by the extent and number of diverticula present. But the frequency with which he meets them soon leads him to suppose that they are a necessary resultant of intravesical tension, and are relieved promptly as soon as the mechanical hindrance to free evacuation of the bladder is removed. At least these are the ideas which I for one had acquired. I had occasionally met with calculi which were incarcerated in these pouches and had operated for their removal, having sometimes to enlarge by incision the orifice of the diverticulum to accomplish their extraction, but that vesical diverticula uncomplicated by calculi were ever the cause of much trouble I did not believe. During the past three years, however, several cases have presented themselves which have compelled me to change my views on the subject. I will relate them in chronological order:

Case I.—*Multiple large diverticula of bladder; very slight prostatic hypertrophy; catheterism; death; autopsy. Great dilatation of ureters and kidneys.* H. T. H., aged forty-seven

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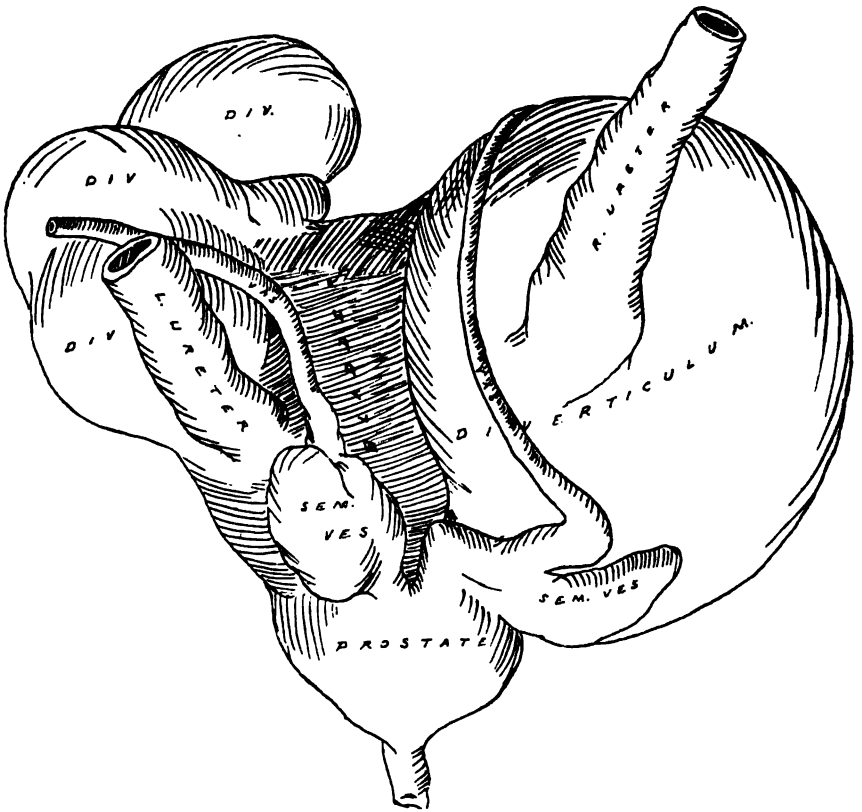
FIG. 1



Posterior view showing bladder, prostate, seminal vesicles and diverticula.

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years, male, admitted to the Johns Hopkins Hospital, Prof. Halsted's service, February 12, 1900. Complaint: "Frequent and painful urination."

Family and past histories negative. Denies venereal diseases. No previous urinary difficulty.

Present Illness. About November 5, 1900, patient noticed an increased frequency in the calls to urinate, and soon began to suffer a burning pain at the head of the penis during and after urination. Urination became gradually more frequent and by December the interval between voidings was about every half-hour; the urine was often of a milky color and sometimes looked bloody. On December 14th he began the use of a catheter, and from that time until January 25th catheterized himself twice a day. Since then he has had to use it more frequently, but is still able to void a portion of the urine naturally. His appetite has been poor and he has lost weight, but he has not suffered pain in the abdomen nor back.

Examination. The patient is very weak and emaciated; lips pale; heart and lungs negative; abdomen flat; kidneys and spleen negative. A slight swelling is noticeable over the right umbilical region. A marked fulness is present in the hypogastric region, extending from the symphysis pubis upward for 8 cm., in the median line. To the left of the line the swelling extends upward and outward into the left iliac fossæ. Over this region the percussion note is flat, and the outlines are rounded and smooth.

The genitalia are normal. On rectal examination the prostate is found to be slightly enlarged, but soft in consistence. Above the prostate a soft bulging mass is to be felt, especially prominent on the right side, and presumably a greatly distended bladder.

February 13, 1901. The following note was made. Since admission patient has voided at frequent intervals (about every hour), the amount varying from 50 to 200 c.c. The urine is alkaline and very foul smelling and contains pus and

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bacteia. After irrigating the bladder with 2000 c.c. of boric acid solution, the fluid came away as thick with pus as at the beginning. Abdomen very tender over the region of the bladder. Patient very weak; cystoscopic examination impossible now.

18th. Patient has been taking urotropin, 10 grains t. i. d., and the bladder has been irrigated twice a day. There is no obstruction to a soft-rubber catheter, but just before the tip of the catheter reaches the bladder the patient always complains of pain. The residual urine varies from 250 to 500 c.c., and the bladder has very little tone.

24th. Patient has had an irregular temperature for the last six days, varying from 98° to 102°. Appetite poor. General condition weak. Urine very foul; full of pus and is alkaline.

27th. 5000 c.c. of boric acid solution were used in washing the bladder to-day, but failed to wash it clear. Patient is gradually becoming weaker. Temperature varies between 98° and 101°.

March 3d. Although the patient has been catheterized regularly and the bladder washed with large amounts of fluid, the urine has remained very foul. The patient has become gradually weaker, the eye lids swollen and tender; face red.

4th. Condition of patient steadily grew worse and he died to-day.

Autopsy No. 1693. The bladder, prostate, and a portion of the membranous urethra and the lower third of the ureter on each side have been preserved in one piece.

As viewed externally the bladder is seen to be more or less covered by diverticula. When seen from the front, the right half of the bladder is almost entirely obscured by two small and one large diverticula, and the posterior part of the left half of the bladder by four medium-sized diverticula. On the posterior surface very little of the bladder wall can be seen owing to the diverticula, as seen in Fig. 1.

The posterior surface of the prostate is about normal in

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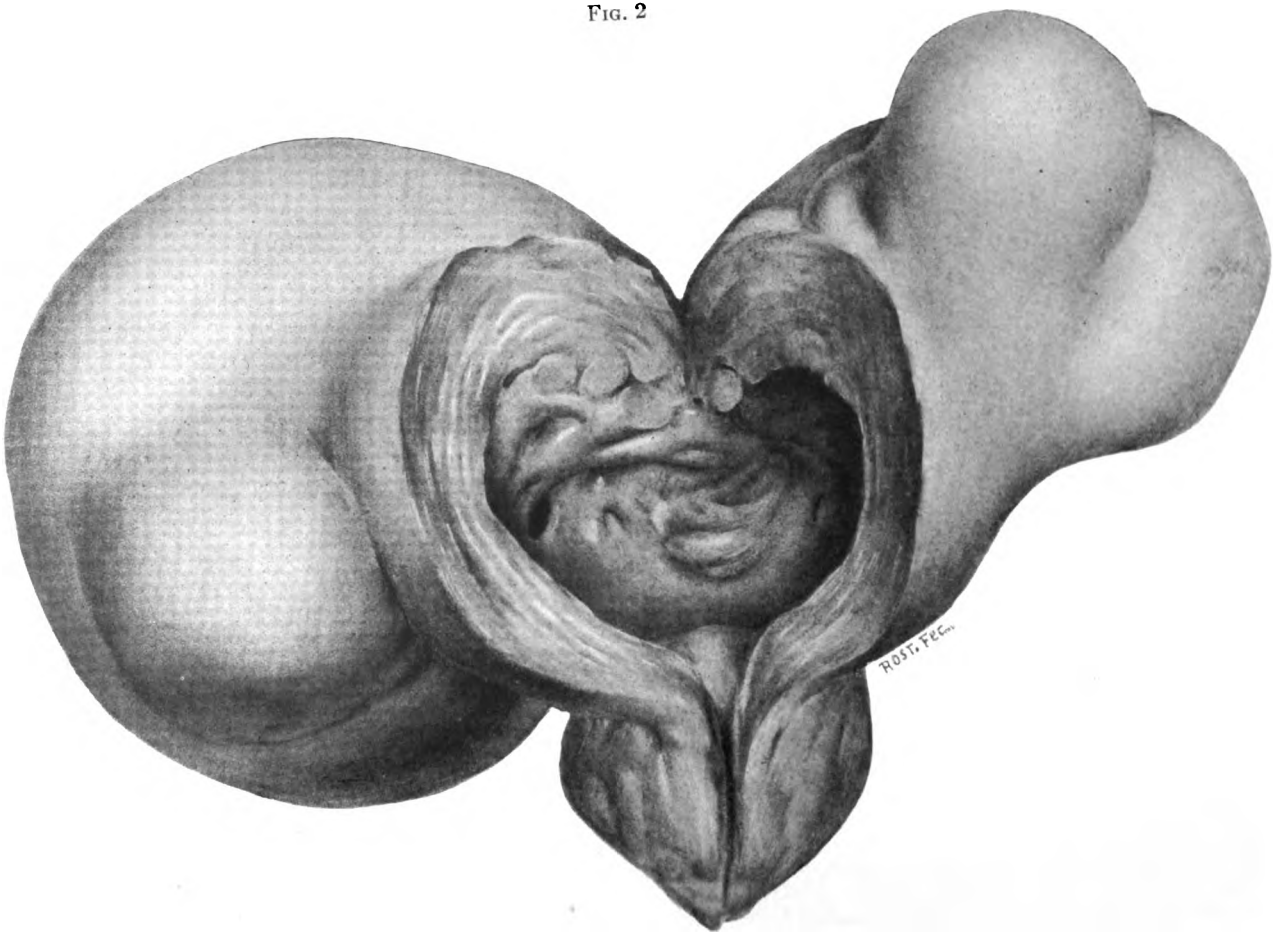
FIG. 2



Showing contracted bladder opened in front and surrounding diverticula. Small median prostatic lobe.

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size. The left seminal vesicle is normal in position, but the right seminal vesicle is depressed by the posterior surface of the largest diverticulum. Both ureters are deflected downward and backward and pass along the inferior walls of diverticula. The right one is closely adherent, and, in fact, is incorporated in the wall of the largest diverticulum. It joins the bladder at about a right angle to its intravesical course. The right ureter is also sharply bent at its junction with the bladder, being first pushed forward and downward by the diverticulum. Both ureters are greatly dilated above their vesical juncture, each being 2 cm. in diameter, but their intravesical orifices are not dilated.

On the left side the vas deferens passes up along the posterior surface of the diverticulum adjacent to the ureter. It is lengthened and drawn out. On the right side the vas deferens is separated from the ureter by the diverticulum.

The bladder and prostate have been opened in the median line in front (Fig. 2). Examination shows a small median enlargement of the prostate in the shape of a somewhat rounded bar with a shallow sulcus on each side, the bar being elevated about 1 cm. above the trigone. The urethra is compressed by this bar, but there is apparently no compression by the lateral lobes of the prostate. The vesical cavity itself measures 4 x 3 x 4 cm. in size. The bladder wall is very thick, varying from 1 to 2 cm. in thickness. The interior shows numerous trabeculations with the orifices of small cellules, and of large diverticula between the hypertrophied muscle bundles.

The diverticula are arranged as follows: Communicating with the right half of the bladder, two small and one large diverticula. The orifice of the large diverticula is about 1 cm. directly external to the ureteral orifice. It is about 1 cm. in diameter, oval in shape, and surrounded by a ring of hypertrophied muscle. The diverticulum into which it opens is larger than a very large orange, and is flattened against the outer surface of the bladder. The mucous

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membrane shows no trabeculations; its surface is roughly granular and of a dull, grayish color. The wall of the diverticulum itself is about 3 mm. in thickness and transmits light very slightly. There are numerous evidences of adhesion to structures around the diverticulum. The ureter is closely adherent to it, being flattened out against the deeper and anterior aspects of the diverticulum for a distance of about 5 cm., and bound to it by strong adhesions. Above this diverticulum are two small diverticula, each about the size of a small pear and connected with the bladder by small, oval openings about 3 x 5 cm. in size. At the vertex of the bladder is an orifice about 8 cm. in size, of a pear-shaped diverticulum, about 3 x 4 cm. in size, and on the left lateral wall three other diverticula of about the same size communicating with the bladder by small openings about 5 mm. in diameter. The orifice of the most inferior of these lies about 2 cm. external to the orifice of the left ureter, but examination shows that the diverticulum itself has been pushed forward and downward, carrying with it the ureter, causing it to make an acute bend at its junction with the bladder. The walls of these diverticula are quite thin and transmit light. The bladder shows a moderate degree of cystitis. No ulcerations; no stones present.

Pathological No. 6138. A longitudinal section has been taken through the walls of two adjacent diverticula of medium size, and includes also a portion of the outer surfaces covered by peritoneum. Beneath the peritoneum is a layer of fat and connective tissue from 1 to 3 mm. thick. The epithelium is absent in most places, but where present is thin, and beneath it is an extensive area of round and polynuclear celled infiltration throughout the entire submucosa. Beneath the submucosa is a wide layer of longitudinal muscle fibres, and external to that are numerous small enlarged bundles of muscles, some cut obliquely and others transversely, and separated by varying amounts of connective tissue, and here and there small amounts of round-celled

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infiltration. Small bloodvessels are quite abundant and show little change. The larger arteries show endarteritis.

CASE II. *Phantom tumor, recurring at intervals of six months, and due to vesical diverticulum at vertex of bladder; operation refused.*—M. C., male, aged seventeen years, came to my office January 31, 1903. Complaint: "Bladder trouble."

Family History. Negative.

Past History. Healthy as a boy. Had gonorrhœa first eighteen months ago. It was a light attack and was well in four weeks. No after-effects.

Five months ago he acquired gonorrhœa a second time, a more severe case than the first, but with no history suggesting prostatic complications and apparently thoroughly cured in two months. No gleet nor evidence of stricture afterward. At no time has there been any obstruction to urination.

Present Illness. Three years ago the patient was awakened during the night with a cramp-like pain in the left side of the abdomen. On arising the next morning he discovered a hard, rounded lump in the left side just above Poupart's ligament. After a while the mass disappeared, but during the next three weeks it reappeared and disappeared, apparently without cause, several times, and the pain was sufficient to keep him in bed. During this time there was no urinary nor intestinal disturbance, but nausea and vomiting occurred.

After that the patient had no disturbance of any sort for six months, but then another attack similar to the first came on and the lump above the left groin appeared the size of his fist. The pain was quite severe for three days and kept him in bed. The lump then suddenly disappeared and he felt well again. No associated urinary disturbance. During the last two years the patient has had two similar attacks, the last two weeks ago, the history of which was as follows:

On January 21, 1903, he was taken with a pain located a little to the left of the median line just above the symphysis

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pubis. He became very nauseated and vomited all night. On the next day he discovered the mass which he had felt before. During this time there was no change in micturition, the urine being voided at normal intervals without pain, and normal in appearance and amount. After the tumor had been present three or four days he noticed, for the first time, blood in the urine. This continued for five days, the color being a deep red, but the amount was normal and urination was without pain or difficulty. For the past week the urine has been normal in appearance, but the tumor has not disappeared, and there is a constant pain in the region about it. The bowels move once a day. The patient does not get up at night to urinate.

Examination. In the lower half of the abdomen is seen a swelling, the outlines of which are shown in the diagram (Fig. 3). On palpation the tumor is hard, non-fluctuating, not adherent to skin, freely movable, and not tender. The contour is rounded; surface smooth. The percussion note is dull, but not absolutely flat, suggesting that a loop of intestines lies in front of it. The size and shape of the tumor remain unchanged after the patient has urinated, which he does with ease. Rectal examination negative; no tumor to be felt; prostate normal. Urine: clear; acid, 1018; no albumin; microscopically negative.

February 2, 1903. Patient returns after two days' absence. The tumor is still present. Micturition normal.

Cystoscopic Examination. A catheter is passed with ease; no stricture present. No residual urine present. With the cystoscope the vesical mucosa is seen to be of normal color, the ureters normal in appearance and functionating actively. The prostatic orifice shows no enlargement.

Study of the anterior wall of the bladder shows that it is markedly depressed by some external object. The anterior and posterior walls are so approximated that only a chink is left between them, and although the cystoscope was pushed up into this, thus separating the two walls, it was impossible

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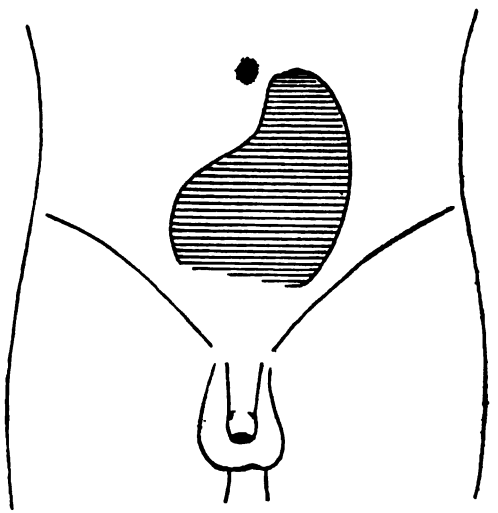
FIG. 3



Showing the area of distended diverticulum.

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to reach or see the vertex. The vesical wall is smooth and the mucous membrane normal.

February 4, 1903. Patient returns after two days absence and reports that the tumor has disappeared. He says that it was present when he went to bed last night, although he was suffering no pain. Once during the night he was awakened with a desire to urinate, and voided a larger amount than usual. On arising this morning he again voided a very large amount, and then on examining his abdomen found that the tumor was gone. As a rule, he does not have to get up at all during the night to urinate.

Examination fails to reveal any trace of the large tumor which was so prominent two days ago. The abdomen is everywhere soft, and there is no dulness on percussion. The urine is normal.

Cystoscopic examination shows at once a marked change in the anterior vesical wall, which is no longer depressed, but presents the usual concavity. It is possible to introduce the cystoscope much farther toward the vertex, but I cannot get a satisfactory study of this region, as the bladder seems to extend upward for an unusually long distance and there is a prolongation or pouch which cannot be explored. It seems probable that the orifice of the diverticulum lies at the end of a much elongated vertex, probably at or near the end of the urachus, but I cannot actually see it.

I strongly advised operation with the object of excising the diverticulum and closing its vesical orifice, but the patient refused it.

One year later the patient reported that he had had several "attacks."

CASE III. *Obstruction to urination for twenty years; catheterism three years; prostate not enlarged; one large and one small diverticulum; suprapubic cystotomy; division of septa; suture of cut edges; restoration of voluntary urination.* O. I., male, aged sixty-six years, came to my office

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October 15, 1903. Complaint: "Inability to void urine; catheterism."

Family History. Negative.

Past History. No previous urinary or venereal diseases.

Present Illness. Twenty years ago the patient noticed for the first time a slight difficulty and increased frequency of urination, associated with slight pain in the deep urethra. These symptoms increased very gradually during the next seventeen years, but by this time the difficulty had become great, and interval very short. He then began the use of a soft-rubber catheter, and after a few months was unable to void naturally.

Catheterization, which was necessary only three times a day at first, now has to be done five or six times in twenty-four hours.

He has particularly noticed two peculiar facts in regard to the use of the catheter, viz.: 1. If the urine is allowed to flow as soon as the instrument enters the bladder only a small amount is obtained, but by introducing the catheter three or four inches farther (twelve inches in all) about 500 c.c. more urine is obtained. 2. If, however, before introducing the catheter he strains (*i. e.*, increases the abdominal pressure) all of the urine will be evacuated when the catheter has passed only nine and one-half inches (has just entered the bladder, as he thinks). As he expresses it, he is "able to throw the urine forward" by this procedure.

He otherwise enjoys excellent health, but the use of the catheter has become so much more burdensome of late that he desires relief.

Status Presens. The catheter is used five times in twenty-four hours. If he strains beforehand he is able to evacuate the bladder easily, but if he fails to do this (as described above) it is always necessary to insert the instrument its entire length before all the urine is obtained.

Examination. Negative with the exception of the bladder.

On rectal examination the prostate is slightly enlarged,

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but the posterior surface is flat. In consistence it is harder than normal. A large silk catheter is introduced with ease and 400 c.c. residual urine obtained. It is extremely difficult to get the bladder clean.

Cystoscopic examination shows that the bladder itself is small, much trabeculated and inflamed, but communicating by small orifices are two extravesical diverticula, one of which lies just behind the trigone in the median line, and the other on the right lateral wall. The latter has an orifice just admitting the cystoscope which shows that the diverticulum is of large size, extending downward and backward beneath the base of the bladder and trigone. The right ureteral orifice lies to the inner side and in front of the diverticulum, and the whole trigone seems to be elevated by the diverticula.

The prostatic orifice shows a very slight enlargement of the lateral lobes, but the median lobe is very small, and in view of the history it seems probable that the inability to urinate is due to the diverticula, which cannot empty themselves and which also, by elevating the trigone so that it presses against the prostatic orifice, prevent outflow of urine from the bladder. A suprapubic attack upon the diverticula seems to be indicated rather than prostatectomy or the Bottini operation.

Operation, November 19, 1903. (Young; ether). Suprapubic cystotomy; division of septum between diverticula and bladder, with suture of the cut edges separately, so as to transform diverticula and bladder into one common cavity; urethral and suprapubic drainage; partial closure; recovery; restoration of normal urination.

The bladder was freely opened and the edges widely retracted, thus giving an excellent view of the entire cavity. The bladder was small, much trabeculated, the trigone elevated, and the ureteral ridges hypertrophied. Just back of the interureteral bar was the orifice about 1 c.m. in diameter, of a subtrigonal diverticulum. When the little

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finger was inserted the cavity seemed to be about the size of a small pear. The orifice of the other diverticulum lay to the outer side of the ureteral orifice. This was not large enough to admit the little finger, but when a probe was inserted the cavity of the diverticulum was found to be very large, extending downward and inward beneath the trigone and base of the bladder and also backward around the rectum. The vesical and diverticular cavities were separated by a conjoint wall or septum from the orifice of the diverticulum to the median bar of the prostate, which was also found to be undermined by the diverticulum. The trigone and the right lateral wall of the bladder were pushed over toward the left by this diverticulum.

The remainder of the bladder wall was much trabeculated, especially the left half, which was separated from the right by a prominent longitudinal ridge. The conditions present and their relative positions are shown in the accompanying diagram (Fig. 4).

The distance between the right diverticulum and the urethra was about 5 cm., and the distance from *A* to the orifice of the right ureter was about 2 cm. The distance between the orifice of the median diverticulum and each ureter was about 3 cm. Longitudinal pouch *P* in the left half of the bladder was 2 to 3 cm. deep and about 3 cm. wide and 6 to 8 cm. long. The urethral orifice shows nothing abnormal, with the exception of a slightly swollen mucous membrane surrounding it. There was no intravesical prostatic enlargement. The median portion was not thickened.

It seemed too dangerous to attempt to excise the diverticula, but as the obstruction was apparently due to the large right diverticulum, which had elevated the floor of the bladder, thus pushing the trigone upward in front of the prostatic orifice so as to prevent the escape of urine through the urethra, it seemed advisable to divide the septum between these two and throw the two into one cavity. In order to do this my prostatic tractor closed was intro-

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FIG. 4

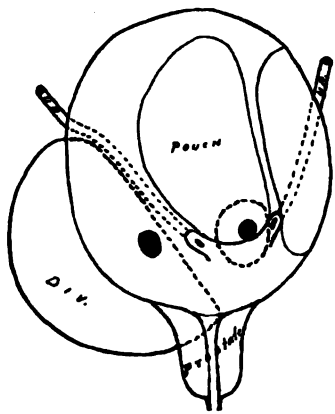
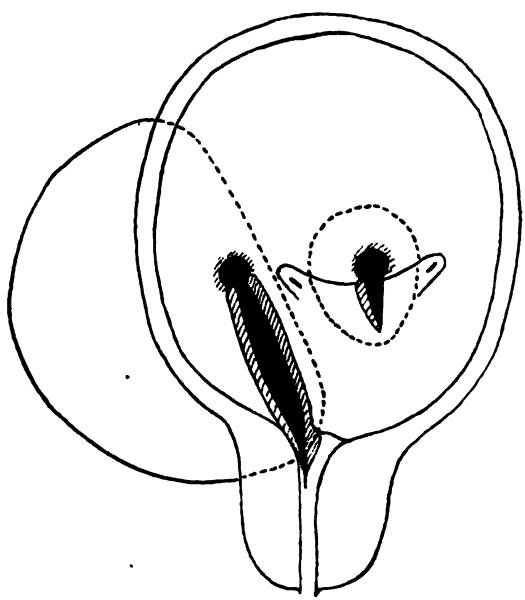


Diagram showing bladder in position of diverticula and pouches.

FIG. 5



Showing the division of septa made at operation.

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duced into the orifice of the diverticulum and the blades separated by rotation of the outer arms of the instrument. Drawing in this way the base of the bladder into the wound, it was an easy matter to divide the septum between the two. This incision was carried in a line between the orifice of the diverticulum and the urethra, and as the diverticulum seemed to undermine the median portion of the prostate the incision was carried through this and finally deepened by means of a Paquelin cautery in the median portion of the prostate, so that the posterior urethra was made to enter directly into the diverticulum, as shown in Fig. 5; the edges of the wound were then sutured together with six interrupted sutures of catgut on each side, thus uniting the mucous membrane of the diverticulum and bladder on each side of the incision, and throwing the two cavities together.

A similar but less extensive operation was done upon the median diverticulum—incision being made forward across the bar of Mercier for a distance of about 2 cm. A single suture was placed in the angle of this wound. Nothing was done to the septum or pouch in the left half of the bladder. A large catheter was passed into the urethra—the internal end extending from the prostatic orifice through the divided median portion into the large diverticulum. The anterior vesical incision was closed with interrupted sutures of catgut, leaving a small opening for a rubber drainage tube. Iodoform gauze was packed around the prevesical cavity and the muscle and fascia were drawn together with several interrupted sutures of silver wire. The skin wound was not closed. Continuous irrigation through the urethral tube and out the suprapubic tube was begun immediately after the operation, and continued for a day or two afterward. There was very little hemorrhage, and the patient reacted well.

The convalescence was uninterrupted. The silver wire abdominal sutures were removed about ten days after the operation. The wound healed well with the exception of

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a small suprapubic fistula, which persisted. A retention catheter was then placed in the urethra and after about a week the suprapubic fistula seemed to be closed, and the urethral catheter was then removed. The patient was able to void his urine normally in amounts varying from 50 to 100 c.c., but after several days the suprapubic fistula again broke open and did not finally heal tight until three months after the operation.

March 18, 1904. The patient is able to void urine naturally in a fair stream—180 c.c. at a time. There is generally about 250 c.c. residual urine present.

April 7, 1904. Cystoscopic examination shows that the large diverticulum connects with the bladder by a large opening, probably 5 cm. or more long, which extends forward to the prostatic urethra, where it shows as a deep cleft in the median portion of the prostate. The diverticulum, while much smaller than before, is still fairly large. The orifice of the small diverticulum, which was less thoroughly enlarged, is now about 1 x 2.5 cm. in size. The pouch in the left half of the bladder is contracted and now shows a large, round orifice. The prostatic median bar is a little more marked on the left side than before and it is probable that there is slight prostatic obstruction present, though the 325 c.c. residual urine which is present can probably be contained in the diverticulum.

The patient is catheterizing himself twice daily on my advice, the purpose being to hasten the contraction of the diverticula. Catheterization is much more easy than before and he does not experience the same trouble in evacuating all the urine.

November 15, 1904. The patient catheterized himself at bed-time, finding about 300 c.c. residual urine. After that he does not void until seven o'clock in the morning, the quantity being from 60 to 200 c.c. After that he urinates at intervals of from two to four hours without pain, and in a large stream.

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General health excellent.

Rectal examination shows the prostate slightly if at all enlarged, median furrow and notch both broad and deep. Contour round, surface smooth, consistence slightly indurated. High up on the right side above the prostate a rounded soft mass can be felt, which is probably the diverticulum. Catheter passes with ease, residual urine 300 c.c. Bladder capacity 600 c.c. Before catheterization patient voided 200 c.c. urine in a fairly large stream.

January 3, 1905. Letter. I am very well and comfortable. I use the catheter at night and empty my bladder of about 300 c.c. of urine. During the day-time I void urine at intervals varying from two to four hours. In this way I get along with little inconvenience and I have never felt stronger or better.

CASE IV. *Two diverticula of the bladder, one very large; suprapubic excision with closure of the openings extravesically; cure.*—E. C. M., male, aged thirty years, consulted me January 2, 1904. Complaint: "Frequency of micturition; pain in back."

Family History. Negative.

Past History. The patient had gonorrhœa first eleven years ago—a severe attack followed by gleet and frequency of urination for six months. During the next four years, at intervals of four to five months, he had attacks of difficulty and frequency of micturition, and cloudy urine, lasting generally several days. Between attacks he felt perfectly well, the urine being clear and voided freely at normal intervals in a large stream.

Six years ago he acquired gonorrhœa a second time. This was a very severe case—characterized by difficulty and frequency of urination, hæmaturia and pain in deep urethra. Finally large clots of blood were passed. He consulted Dr. Lewis C. Bosher, of Richmond, Va., who reports that he found a tight stricture of the bulbomembranous region of the

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urethra, through which he was able to pass a filiform and sounds up to No. 20 F., but thought it advisable to perform a combined external and internal urethrotomy. This was done on May 21, 1904. The patient convalesced well, and on June 30, a No. 30 F. sound passed with ease. During the next year a large sound was passed about once a week. There was no evidence of return of the stricture, urine being voided in a large stream at normal intervals. For three years thereafter he had no urinary trouble of any sort.

About eighteen months ago the patient had an attack characterized by frequency and difficulty of urination. This lasted about a week and finally passed off with no other treatment than urotropin. For the next three months he felt perfectly well, when another attack similar to the first came on. These attacks occurred thereafter at intervals of four or five months. Between attacks he would arise only once during the night to urinate; the stream was large and he suffered no pain.

In September, 1903, he had an attack more severe than any before. After four days he was voiding urine about every half-hour, and suffered severely with pain in the neck of the bladder and in the back. He was seen by Dr. W. P. Matthews, who writes me as follows; "I saw Mr. M. October 1. He had a well-marked cystitis, but improved after a few days' treatment and left the house. Later the symptoms became much aggravated; there was a great deal of pain in the right side of the pelvis, associated with intense tenesmus. Finally complete retention of urine came on and the catheter had to be used. There was no stricture present. For about two weeks he passed more pus than I have ever seen before in the urine. The sudden increase in the amount of pus and its character convinced me that an abscess had ruptured into the bladder."

According to the patient this sudden increase of pus occurred one day after the bladder had been forcibly distended by hydraulic pressure through the catheter—a large

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amount of pus escaping with the irrigating fluid when it was allowed to flow out. His physician said that the abscess had ruptured during irrigation. Complete retention of urine lasted only four days, but the catheter was used once a day thereafter for lavage of the bladder, and a considerable amount of residual urine was always found present. Since then the patient has catheterized himself once daily to draw off the residual urine and irrigate the bladder. Under this treatment he has improved physically and has had no pain in the bladder, but the amount of residual urine has not decreased. After catheterization he usually does not void for from four to six hours, but after that he voids every two hours, day and night.

On December 9th he had an attack of pain, colicky in character, located beneath the costal margin on the right side, at which place there was considerable tenderness on pressure. On January 4, 1904 he had a similar attack which lasted for several hours. The pain was severe in character, and morphine was required. During the attack he also suffered with "shooting pain which ran down from the kidney to the bladder." Fever, nausea, and muscular rigidity over the kidney accompanied this attack, and it seemed to be definitely renal in its location.

Examination. The patient is thin and pale. Heart and lungs negative. Abdomen negative. Genitalia negative.

Rectal Examination. The prostate is slightly harder than normal and the secretion obtained by massage contains numerous pus cells (no note made as to the condition around the rectum above the prostate).

Urethral examination with bougie à boule and sounds shows no evidence of stricture. With a finger in the rectum and a sound in the urethra, no increase in the median portion of the prostate is made out. Catheters pass with ease; 350 c.c. residual urine present.

Urinalysis. Cloudy; acid; albumin microscopically; pus cells and bacilli numerous.

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Cystoscopic Examination. The patient voided 300 c.c. of urine. Immediately afterward a catheter was passed and 330 c.c. residual urine obtained. The bladder is washed clean with great difficulty. The vesical tonicity seems good, but in order to evacuate all of the fluid it is necessary to make pressure upon the lower abdomen.

The cystoscope enters with ease. Examination shows a large diverticulum, with an orifice apparently 2 or 3 cm. in diameter in the right half of the floor of the bladder. The trigone is elevated and pushed to the left. The inner margin of the diverticular orifice projects into the bladder in the shape of a ridge, or even septum, which is continuous with a very prominent interureteral bar in front. The left ureteral orifice is seen far out on the left lateral wall of the bladder, and behind and external to it is the opening of a much smaller diverticulum. While inspecting this a string of mucus is seen to rush out from the orifice on inspiration, and then be drawn in again when the patient expires.

Between the two diverticula, as shown in the diagram (Fig. 6), is a fairly deep, broad pouch, bounded in front by the interureteral bar, on the left by the hypertrophied ridge of the left ureter, and on the right by the prominent ridge, described above as the inner margin of the large diverticulum. The right ureteral orifice cannot be seen, but by comparison with the opposite it seems certain that it opens into the large diverticulum on the inner wall just within the orifice.

When the cystoscope is introduced within the large diverticulum, the mucous membrane is found to be smooth and moderately inflamed; the size of the diverticulum is very large, extending backward beneath the floor of the bladder and forward beneath the trigone.

Study of the prostatic orifice shows a slight inflammatory thickening of the mucous membrane, but no definite enlargement.

February 9, 1904. The patient has now been under observation for six weeks. During a part of this time the

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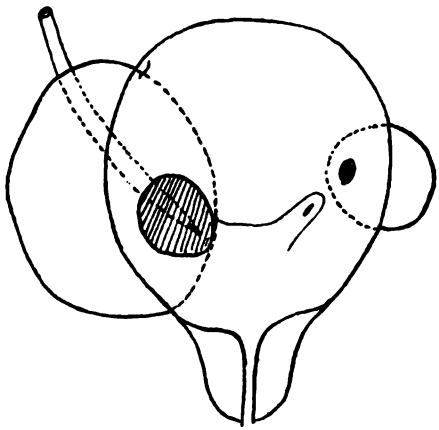
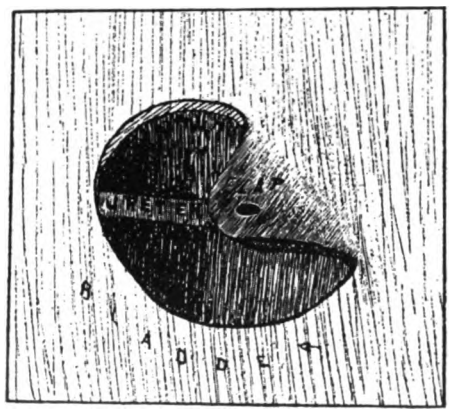
FIG. 6



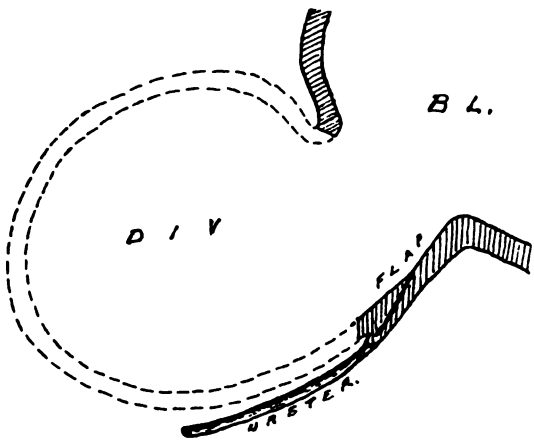
The orifice of right ureter is seen in the cavity of the large diverticulum.

FIG. 7



Showing flap of inner wall of diverticulum around ureteral orifice left attached to the vesical orifice of the diverticulum.

FIG. 8



Schematic section of bladder and diverticulum at orifice, showing excised portion and flap with ureter attached.

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bladder was catheterized three times a day and washed out in the hope that the diverticula might contract. The residual urine, however, did not diminish and we next tried massage of the prostate and frequent dilatation of the posterior urethra up to 38 F. with the Kollmann dilator, but with no better success. The patient is able to void fairly freely and at times as much as 300 c.c. at a time, but there is always a residuum of over 300 c.c. and it seems not to be due to urethral obstruction, but to an inherent inability of the diverticula to contract or collapse.

Remark. The conditions are different from those present in Case III., in that the principal diverticulum has a very large orifice which can offer no obstruction to the free evacuation of its contents. The operation performed in that case (enlargement of the orifice, with suture of each cut edge) would, therefore, probably do no good. The presence of symptoms indicative of impairment of the right kidney would seem to show that the right ureter is being compressed between the diverticulum and bladder, and for that reason, if for no other, it seems advisable to attempt to extirpate the diverticulum before any further harm (such as we see in the specimen of Case I., viz., dilatation of the kidney pelvis and destruction of the cortex) can result.

Operation, February 10, 1904. (Young; ether.) Suprapubic, extravesical excision of a large diverticulum, with closure of the opening by twelve interrupted catgut sutures; intravesical enucleation of sac of a small diverticulum; closure of primary incision in bladder by fifteen catgut sutures; drainage of bladder through a perineal urethrotomy; drainage of retrovesical space with a rubber tube behind the prostate through a posterior perineal incision, not entering the urethra; partial closure of suprapubic wound with interrupted silver-wire sutures; iodoform-gauze packing down to vesical sutures at lower angle; intravenous infusion of 900 c.c. salt solution; recovery.

The peritoneum was easily pushed back, exposing the

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anterior wall of the bladder, but it was impossible to isolate the diverticula without opening the bladder, owing to the thickness of the inflammatory tissue around them and the dense adhesions which bound them to the outer surface of the bladder.

With the bladder widely opened we found the conditions present exactly as predicted. The right ureteral orifice lay just within a diverticulum holding probably 300 c.c. with an orifice 2.5 cm. in diameter. A probe showed that the ureter passed upward between the vesical and diverticular walls, while the left ureter passed to the inner side of the smaller diverticulum, which was found to be about the size of a small hen's egg. The prostatic orifice showed no hypertrophy. The trigone was elevated and pushed to the left and behind it was a broad, shallow pouch. The walls of the large diverticulum were very thick, fibrous, and closely adherent to the bladder (which it undermined), to the rectum, the right lateral wall of the pelvis, extending back even to the sacrum. The anterior edge of the diverticulum was first cut away from the bladder, and, after finding with some difficulty the best layer of cleavage, the sac was shelled out by blunt dissection, assisted at times by knife or scissors, leaving the external fibrous envelope. In this way hemorrhage and the danger of injuring surrounding structures (the large vessels, the rectum, and the ureter) were avoided.

The remainder of the neck of the sac was then divided at its junction with the bladder, except at the anterior portion of the internal border of the orifice, where the incision was carried down into the diverticulum so as to leave a rounded flap of diverticular wall around the ureteral orifice. In this way the normal sphincteric orifice of the ureter was preserved, and division and transplantation of the ureter avoided, as shown in Figs. 7 and 8. The ureter could be felt in the wall of the cavity that remained, but it was nowhere exposed. In excising the small diverticulum I operated entirely from within the bladder. My prostatic tractor was introduced

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through the orifice, opened out, and traction made, thus drawing up the diverticulum with the vesical wall which covered it. A circular incision was then made through the mucosa at the vesicodiverticular juncture, and, by blunt dissection with the handle of a scalpel, the sac was gradually freed from its investments and drawn out (much like the pile-bearing area in Whitehead's operation), and, finally, enucleated intact. The cavity left was surrounded by a thick fibrous wall which it was thought best to incise extravesically so that it could be drained, and so that the opening in the bladder could be closed by an extravesically placed purse-string catgut suture. The opening in the bladder left by removal of the large diverticulum was then closed by twelve interrupted catgut sutures, including the muscle and submucosa and drawing the ureteral orifice into the bladder cavity. The same sutures were used to close the primary median line vesical incision. A urethral (perineal) drain was provided with the view of keeping the bladder empty. To properly drain the deep space which was left by the removal of the large diverticulum it was thought best to provide dependent perineal drainage for this, too, and the opening for this purpose was made by pushing a finger from the cavity outward, behind the prostate, through the levator ani, to the perineum, where the skin was incised in the median line just in front of the rectum, and a tube inserted. (This procedure I now believe to have been unnecessary.)

The operation had been long and tedious and, although little blood had been lost, the patient was somewhat shocked after removal from the table, and an intravenous infusion was therefore given. When the patient returned to the ward his condition was fairly good.

Convalescence. For two days the patient suffered considerably from gaseous distention of the intestines, pain and tenderness in the hypogastric region, and after that he improved slowly owing to the breaking down of some of the vesical sutures, and consequent suprapubic leakage of urine.

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On May 10, 1904, the following note was made: The patient was operated on three months ago. He has had a very tedious convalescence owing to the slowness of the suprapubic fistula in healing. On several occasions he has worn a ureteral retention catheter for two weeks, when the fistula seemed tightly closed, but broke down after a few days. The fistula is now apparently well healed. He is voiding urine every hour in small amounts, but without difficulty.

Examination. The suprapubic wound is healed with exception of a small area at the lower end, where it is granulating. The catheter passes with ease and only about 30 c.c. residual urine is obtained. The vesical capacity is small, the patient complaining when 70 c.c. is introduced. With the cystoscope there is seen a slight dimple in the mucosa where the orifice of the small diverticulum lay. At the site of the large one an oval depression apparently lined by epithelium is shown. The median vesical wound is also tightly healed and the scar narrow. Both ureters are visible, but widely separated from each other. The patient is discharged with instructions to begin intravesical irrigations with the idea of dilating the bladder at a later day.

July 18th. There was no leakage for two weeks, but a swelling then came in the lower angle of the wound and the fistula soon broke open again. He is now passing about three-fourths of the urine through the urethra, and the fistula seems to be slowly healing.

August 2d. The patient returns for examination. He says that he has never been able to void freely, and now that the fistula has opened nearly all of the urine comes through it. He has suffered very little pain, and has gotten much stronger physically.

Examination. The suprapubic wound is apparently closed, but patient says it is only temporarily sealed up. On rectal examination the prostate is found to be a little harder and larger than normal. The left seminal vesicle is soft, and there is no induration above it. In the region of

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the right seminal vesicle and extending upward and outward from it is a large indurated mass adherent apparently to the rectum and the upper edge of the prostate, probably the cicatrix of the operation upon the diverticulum.

Cystoscopic Examination. A coudè catheter passes into the bladder with ease and finds 30 c.c. residual urine present. Bladder capacity 110 c.c. Vesical tonicity good. Cavity washed clean with moderate ease. Study of the prostatic orifice with the cystoscope shows a definite enlargement of the right half of the median portion of the prostate, which is continuous with a slight enlargement of the right lateral lobe. Continuous with this median enlargement is a prominent fold of vesical mucous membrane which runs outward and backward and disappears in the orifice of the diverticulum. Another such fold running from the diverticular orifice to the anterior wall of the bladder is seen. The left lateral lobe is also slightly enlarged, and there is a shallow but definite cleft between it and the right lateral lobes. Study of the bladder shows the left ureteral orifice in a prominent ridge far to the left. *The right ureter is almost in the median line at the other end of the interureteral bar.* In front and to the outer side of it is a shallow pouch the floor of which can easily be seen, evidently the site of the excised diverticulum. This pouch has an orifice about 1 x 3 cm. in size and is lined by smooth mucous membrane. On the left lateral wall of the bladder a small depressed scar is seen at the site of the small diverticulum.

With the finger in the rectum and cystoscope in the urethra a definite increase in the thickness of the median portion of the prostate is made out.

Remark. The failure of the suprapubic fistula to close, the presence of 30 c.c. residual urine, the recurrence of a small pouch at the site of the excised diverticulum and the small size of the stream of voided urine all indicate obstruction, and the cystoscopic findings seem to indicate that sufficient enlargement of median and lateral portions of the

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prostate are present to furnish this obstruction. It is therefore decided to perform a Bottini operation with a small blade in order to relieve the obstruction.

Operation, August 4, 1904. (Young; chloroform.) Bottini operation; three cuts with blade No. 2 of my model; posterior cut 1.7 cm.; right lateral 1.8 cm.; left lateral 1.6 cm.; instrument at a white heat; duration of each cut one and one-half minutes; excision of suprapubic fistula; division of intravesical septum of mucous membrane with scissors in the bladder.

After excising the suprapubic sinus a finger was inserted into the bladder and the following noted: Prostatic orifice is so small that the index finger is introduced with great difficulty, the orifice being tightly contracted. There is a slight elevation of the median portion of the prostate, and a little increase in the size of the right lateral lobe. A very prominent fold of mucous membrane running from the orifice of the diverticulum across the trigone was made out and divided by means of a long scissors. The finger was inserted into the orifice of the diverticulum, which was found to be about the size of a small hen's egg. No other diverticulum present. The orifice of the diverticulum was about 1 x 2½ cm. in size. After the Bottini operation had been done the prostatic orifice was examined by the finger; the cuts were found to be wide open and the finger was inserted into the urethra with ease.

Convalescence. The suprapubic leakage ceased on the sixteenth day, urination being markedly easier than before operation. Patient was discharged on the twenty-first day. For several weeks he suffered with slight incontinence of urine, but three months after the operation reported that he only had to get up once or twice at night to urinate, at times holding his urine as long as five hours. Urination free, no hesitation, stream large. Five months after the operation the patient reported that his urine was clear; that his health was excellent, and urination normal.

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Pathological Report No. 5524 *A.* A section was taken from the large diverticulum. It varies from 4 to 8 mm. in thickness. The epithelium is absent, and the submucosa very thin. Beneath the submucosa are numerous layers of smooth muscle running in various directions, and separated by very little connective tissue. There is a moderate amount of round-celled infiltration, and considerable endarteritis. Outside of the musculosa is a layer of fat and loose connective tissue, with here and there a large mass of round cells. The musculosa is at least 2 mm. thick.

B. Small Diverticulum. Section taken from a point farthest distant from the orifice. It consists of submucosa, a wide layer of muscle and outside of that fat and connective tissue. General characteristics are the same as that of the large diverticulum described above. The layers of muscle are very abundant and run in all directions.

CASE V. *Small diverticulum lying in the urachus, produced by a fall; intermittent pain and tenesmus; cured by suprapubic excision of diverticulum.*—J. E. H., male, aged thirty-four years; admitted to the Johns Hopkins Hospital, Prof. Halsted's service, January 18, 1904. Complaint: "Intermittent spasmodic pain in abdomen."

Family History. Negative.

Past History. Has never had gonorrhœa. No previous urinary trouble.

Present Illness. In March, 1899, while riding on a railway locomotive, of which he was the fireman, he saw another train approaching, and jumped from the engine just in time to escape the collision which occurred. He fell upon his buttocks and as soon as he recovered from the shock felt a severe pain in the lower portion of the abdomen. On examining with his hand he found a lump about the size of a hen's egg beneath the abdominal wall at a point just below and to the left of the umbilicus. Urine had not been voided for some time before the accident, and not until an hour or

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so later. The swelling gradually disappeared in the course of a month and has never reappeared, but at frequent intervals the pain has returned in the region. By emptying his bladder frequently he can generally avoid these attacks, but if the bladder becomes very full, he begins to suffer a severe pain below and to the left of the umbilicus, which increases as the bladder is emptied, and persists for five minutes after the end of urination, and is accompanisd by spasm of the abdominal muscles to the left of the umbilicus. Of late these attacks have occurred about every two weeks and have been so severe as to prevent his following his occupation. He has often been awakened at night by the pain and has always found that his bladder was very full. His physician has told him that he was suffering from floating kidney and he comes here for operation.

Examination. The abdomen is normal in appearance, and on palpation nothing is to be felt, but the left rectus muscle is held very tense and on pressure the patient complains of pain beneath the level of the umbilicus, the point at which the patient says he found the swelling and in which he has had the attacks of abdominal pain and cramps. Percussion negative; genitalia normal; prostate not enlarged.

Urethral Examination. No discharge; no stricture present.

Cystoscopic Examination. The mucous membrane of the bladder is of healthy appearance, the ureters functionating normally; no enlargement of the prostate; vesical wall not trabeculated.

High up on the anterior wall, in the region of the vertex, the orifice of a diverticulum is seen. It is extremely small in diameter, and surrounded by normal-looking mucous membrane. During the examination the patient began to complain of the old pain and tenesmus and the cystoscope showed the orifice of the diverticulum to be contracted. The pain increased in severity, doubling the patient up, so that the cystoscope had to be withdrawn. On palpation the left rectus was found to be spasmodically contracted, and pain

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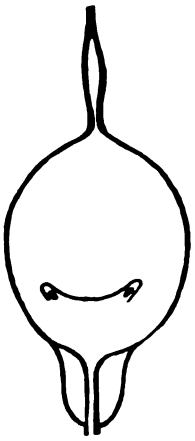
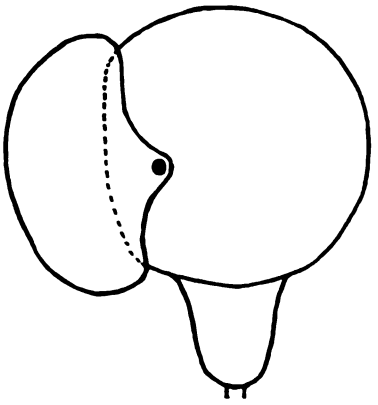
FIG. 9



Showing small diverticulum in urachus.

FIG. 10



Showing diverticulum attached to anterior wall of bladder on right side.

FIG. 11

Photograph of diverticulum excised by suprapubic extravesical operation.

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was elicited by pressure below the umbilicus. After a few minutes the pain and spasm disappeared.

Urinalysis. Clear, 1017, acid, no sugar, a trace of albumin. Microscopically, hyaline and granular casts; pus cells few.

Operation, January 28. (Young; ether.) Excision of a small diverticulum lying in a dilated urachus; complete closure of bladder with interrupted catgut; healing per primam.

The anterior wall of the bladder was exposed through a generous suprapubic median line incision, the peritoneum being well retracted. An unsuccessful attempt was made to find the diverticulum without opening the bladder, which was then incised. With the interior of that viscus thoroughly exposed the orifice of the diverticulum was sought with a fine probe, but in the collapsed, corrugated condition of the mucosa it was impossible to find it. Believing that it must be situated in or near the urachus, that structure was isolated by further stripping back of the peritoneum (which was accidentally cut into, but successfully sutured), and, as it was distinctly larger than normal, a transverse incision was made, thus exposing within it a small collapsed cavity, lined by mucous membrane. A very fine probe was then easily passed into the vesical cavity, entering behind a valve-like fold which had completely hidden the opening of the diverticulum (Fig. 9). The walls of the diverticulum were very thin and entirely surrounded by the tissues of the urachus. In its collapsed condition it was impossible to determine the size of the diverticulum, but it probably measured 3 cm. in length and about 1 cm. in diameter.

The incision in the bladder was continued upward until it included the anterior wall of the diverticulum, thus leaving only one large opening into the bladder to close. The diverticular mucous membrane was then dissected out and the bladder closed tight by two rows of interrupted catgut sutures. The urachus above with the mucous membrane

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lining it was not further disturbed. The skin and rectus muscles were closed with interrupted sutures of silver wire, with the exception of the lower angle of the wound, which was left open for a gauze pack which extended to the line of vesical sutures. No urethral catheter was inserted.

Patient had a rapid convalescence. There was no leakage from the suprapubic wound, which healed satisfactorily. The patient was not catheterized, and the bladder did not become infected.

February 23d. Urine is voided freely at nearly normal intervals. Since operation the patient has had no recurrence of the pain and tenesmus which occurred at such frequent intervals up to the time of the operation. He can now allow his bladder to become fully distended with impunity, and feels perfectly relieved.

The cystoscope shows a tightly healed wound along the anterior wall of the bladder. No diverticular orifice present. Patient discharged well.

March 16, 1905. The patient writes that he is entirely well; that he voids urine about three times in twenty-four hours; has had no pain of any sort. The attacks of tenesmus which were present up to the time of operation have not reappeared since, and his wound is solid and urine clear.

CASE VI. *Large diverticulum of bladder due to hypertrophied prostate; suprapubic extravesical excision of diverticulum; perineal prostatectomy; cured.* No. 558.—J. R. B., aged sixty-three years; admitted February 18, 1903. Complaint: "Difficulty and frequency of urination."

Family History. Negative.

Past History. Unimportant. No previous urinary trouble. No history of venereal disease.

Present Illness. Began about two years ago with an increased frequency of urination and difficulty in starting stream. Since then there has been a gradual increase in the obstruction, and micturition has become much more frequent,

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so that now he has to void urine every fifteen minutes. He has found that after voiding as much as possible in a standing posture he will be able to void more if he "squats down, bends his body forward against his knees and strains with his abdominal muscles." After that procedure he is able to stand up and pass a good deal more urine.

The patient has suffered no pain, and has never had complete retention of urine nor been catheterized.

Examination (in brief). Urine clear, contains no pus, no bacteria. The prostate by rectum is moderately enlarged and soft. A catheter passes with ease and finds 1200 c.c. residual urine. The cystoscope shows intravesical enlargement of the prostate in the shape of a collar, with only one cleft, and that anteriorly between the lateral lobes. The median bar is only moderately enlarged, but behind it is a definite pouch in which the ureters are easily seen. The bladder wall is moderately trabeculated and several irregular pouches are seen behind the trigone. On the right half of anterior wall of the bladder, about 2 cm. distant from the median line and 4 or 5 cm. distant from the urethral orifice, is the opening of a diverticulum. Into this orifice the shaft of the cystoscope will barely pass, but after its introduction one sees at once that it is within the cavity of a large diverticulum, which extends downward along the right lateral wall of the bladder for a great distance, it being impossible to explore completely the bottom of the sac. The mucosa is smooth, healthy in appearance, and no trabeculæ are present within the diverticulum.

Percussion of the lower abdomen, when the bladder was full, showed an extension of the vesical flatness well toward the right iliac fossa. This was absent on the left side.

The following note was made: A large diverticulum is present as shown in the accompanying diagram (Fig. 10), representing the anterior surface of the bladder. The patient requires operation for the enlarged prostate, but it seems advisable to remove the diverticulum on account of

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the fear of subsequent infection in such a large perivesical pouch.

Operation, February 22, 1904. (Young; ether.) Trendelenberg position; suprapubic extravesical extraperitoneal removal of enormous diverticulum; suture of orifice of communication with bladder; partial closure of abdominal muscles and skin; small superficial drain of gauze; dorsal lithotomy position; inverted V cutaneous perineal incision; exposure of prostate, urethrotomy of membranous urethra, insertion of prostatic tractor, bilateral capsular incisions, enucleation of two large lateral lobes, and a small median bar, without tearing the prostatic urethra, the bladder, or the ejaculatory ducts; removal of tractor and insertion of double drainage tube; cutaneous wound partially closed; patient in excellent condition; convalescence rapid; suprapubic suture of diverticular orifice did not break down or leak; on the tenth day patient could hold urine for four hours; discharged on the twenty-seventh day, well.

The operation is so fully described in the heading that very little need be added. After making a free median line suprapubic incision, and pushing back the peritoneum from the anterior surface of the bladder, the diverticulum was at once brought into view. A metallic catheter which had been previously introduced was then passed into the diverticulum, the walls of which were so thin that the catheter could easily be seen through it.

Examination then showed that the diverticulum was spread out over the anterior half of the bladder, and extended back around the right side toward the rectum and upward beneath the peritoneum, being laterally in contact with the pelvic wall and posteriorly with the sacrum. There were no dense adhesions, however, and as soon as the neck had been cut away from the bladder, the sac was drawn out of its bed with ease, and with practically no hemorrhage. It measured about 12 cm. in diameter and probably held 500 c.c. of urine, as shown in Fig. 11. The closure of the vesical orifice was

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effected with a purse-string suture of catgut, placed extravesically so as to invert the edges of the orifice. The bladder was not opened, and no injury was done the peritoneum. The recti muscles were then brought together with interrupted sutures of catgut, and the skin closed with a subcuticular silver suture, leaving a small drain in the lower angle of the wound.

The prostatectomy was done in accordance with the method employed by the writer.[1] After the posterior surface of the prostate had been exposed through an inverted V cutaneous incision, the membranous urethra was incised on a staff and the prostatic "tractor" inserted through the prostatic urethra into the bladder. The blades were then opened out and traction made, thus drawing down the prostate well toward the skin wound. Capsular incisions were then made parallel to the median line on the posterior surface of the prostate, each about 1½ cm. deep, thus leaving a bridge of tissue surrounding the ejaculatory ducts and posterior to the urethra. With a blunt dissector the lateral lobes were freed from the capsule externally and the urethra internally. The finger was then used to complete the enucleation of the deeper and intravesical portions of the lobes. The median bar was drawn into the left lateral lobe and there enucleated, after which the tractor was removed and an index-finger passed through the urethra into the bladder, to see whether any lobule had escaped.

Drainage of the bladder was provided, the lateral prostatic cavities lightly packed with gauze, and the cutaneous wound partly closed with catgut sutures.

Convalescence. The convalescence was uneventful. There was no leakage of urine from the suprapubic wound, which healed rapidly. On the tenth day the urine was still coming through the perineal wound, but the patient had no inconti-

[1] Journal of the American Medical Association, October 24, 1903; ibid., February 4, 1905. Monatsberichte für Urologie, Bd. ix., Heft 5 u. 6, 1904.

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nence and voided at intervals of six hours. He left the hospital on the twenty-seventh day apparently well; perineal wound closed.

Three Months After Operation. Patient says he passes urine freely, often 500 c.c. at a time. He feels well. There is no residual urine present, and the bladder capacity is large. The cystoscope shows an absence of prostatic enlargement. The scar at the site of the diverticular orifice is small and almost flush with the surface of the bladder. The urine is slightly cloudy and contains leukocytes and bacilli.

Report One Year After Operation. Patient maintains condition same as above described. Feels perfectly well. Has a small ventral hernia in site of suprapubic wound which is satisfactorily retained by a truss.

Pathological Report No. 5311. The wall is about 3 mm. thick. It consists of mucosa, submucosa, several layers of muscle. The external layer of fat and connective tissue is wanting. The epithelium is very well preserved, consists of many layers of pavement epithelium, with no evidence of inflammation. Normal bloodvessels are numerous in the submucosa, which is fairly wide. The muscle consists of small and large bundles of smooth fibres running in various directions, some cut transversely, some obliquely, and some longitudinally.

In section 2, taken from another part of the diverticulum, there is a considerable dilatation of the bloodvessels on the submucosa, and great numbers of polynuclear leukocytes are to be seen throughout the tissues of the submucosa, and in places in the musculosa. The epithelium is only preserved in places, but shows no evidence of inflammation.

CASE VII. *Man, aged eighty-five years; retention of urine; catheterism; death; autopsy; slight prostatic hypertrophy; three vesical diverticula; one to the right side of each ureteral orifice, and one at the vertex of the bladder; no operation; death from uræmia.*—J. B. M., aged eighty-five years, after a fall began

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to have difficulty and frequency of urination for the first time. Retention soon set in and catheterization was required.

I saw the patient on October 1, 1903, and made the following note: The patient is still (after about two weeks) unable to urinate and is being catheterized about every seven hours, from 250 c.c. to 300 c.c. of urine being obtained each time. The bladder is washed out with great difficulty, owing to pus and blood, and a satisfactory cystoscopic examination cannot be obtained. The cystoscope shows considerable trabeculation of the bladder and a chronic cystitis, but the vesical base cannot be seen on account of a large old blood clot. Study of the prostatic orifice shows no lateral lobe enlargement, but there is a small but definite median lobe, with a slight sulcus on each side of it. With the cystoscope in the urethra and the finger in the rectum, a definite increase in the median portion is made out. The lateral lobes are slightly enlarged, contour smooth, consistence firmer than normal.

Owing to the small size of the prostate and the sudden onset of obstruction after a fall no operation was attempted, but the continued use of the catheter advised. After a few days the patient began to void small amounts of urine, and the residual urine gradually decreased until finally very little remained after voiding, and the intervals between urinations reached two or three hours. The patient then returned home, and enjoyed fairly good health for several months, being able to void urine satisfactorily. About seven months later the patient again began to have considerable difficulty and frequency of urination. The catheter showed a residual of 300 c.c., and it was ordered to be used twice daily. This was done regularly, but in a few days the patient showed symptoms of uræmia, which increased rapidly, and on July 12, 1904, after being comatose for two days, death ensued.

An autopsy was obtained after the body had been embalmed. The kidneys, ureters, bladder, and prostate were removed in one piece.

The specimen has been fully distended with formalin

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solution, and a glass tube fastened in the urethra. To-day the tube is removed, the bladder emptied and split open in the middle line in front.

The bladder wall is very thick, varying from 1½ to 2 cm. The cavity of the bladder itself is very small, probably not holding more than 50 c.c. The mucous membrane is inflamed and in places covered with exudate. The bladder wall is trabeculated, but the trabeculations lie so close together that they are difficult to see. Between these trabeculations are many small orifices which communicate with small and large perivesical and intramuscular cellules and diverticula. These lie principally on the posterior and lateral walls. At the apex of the bladder is a rounded orifice about 1 cm. in diameter communicating with a diverticulum globular in shape, 5 cm. in diameter, and covered entirely with peritoneum. In front of this are two and behind one small diverticula, each of which communicates by a long, narrow tube with the interior of the bladder, the orifice being surrounded by very thick muscle. On the right side of the bladder is a large globular hernia-like mass about 4 cm. in diameter which, when opened into, is found to be composed of a large central diverticulum with a small orifice and two smaller diverticula, all communicating with the bladder by separate orifices, but close together. When viewed from the interior these orifices are found behind and to the outside of the ureteral ridge, and from 2 to 3 cm. distant from the ureteral orifice. In the left half of the bladder in a similar location are the orifices of several small diverticula, the largest of which is about 2.6 cm. in diameter, lies behind and to the outside of the ureter, causing an acute flexure in it at its posterior junction with the posterior surface of the bladder. This orifice is so small that it barely admits a probe. The posterior surface of the bladder is very thick, in places 2 cm., and the median section alone shows five intramuscular cellules connecting with the bladder by very long, narrow necks, so delicate that they cannot be seen on the interior of

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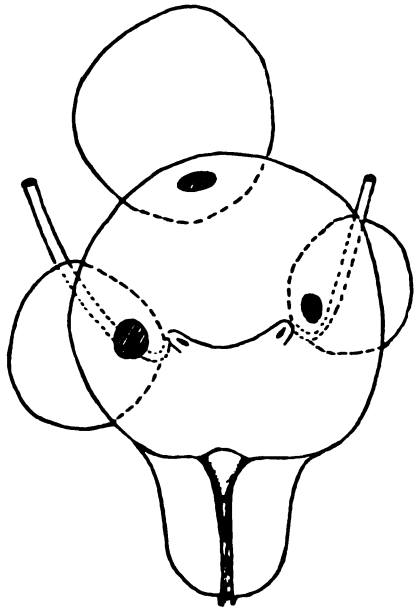
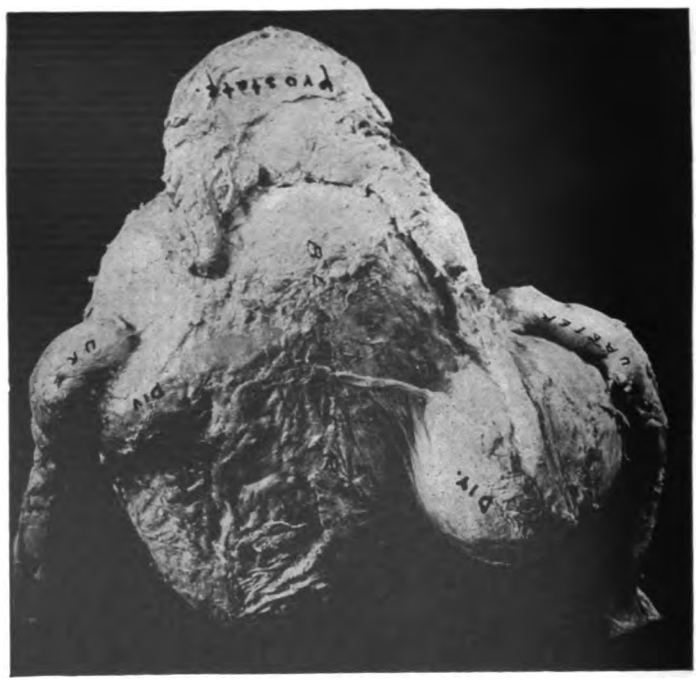
FIG. 12



Showing location of three principal diverticula.

FIG. 13



Photograph of posterior surface of bladder and prostate, showing two diverticula and the kinking and dilatation of ureters.

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the bladder. Fig. 12 shows the location of the principal diverticula. The interureteral bar is quite prominent, and behind it is a pouch about 1½ cm. deep, 2 cm. wide, and 3 to 4 cm. long, beneath which the bladder wall is very thin, measuring from 2 to 3 mm. in thickness and containing very slight trabeculation. The posterior limit of this pouch is formed by a sudden increase in thickness of the bladder wall, which from that point upward is at least 1½ cm. thick. The ureteral orifices are small and slit-like and lie in hypertrophied ridges. A probe passes directly up the ureter on the right side, there being no apparent kinking produced by the diverticulum. On the left side the probe will not pass, probably owing to a bend in the ureter at its juncture with the bladder produced by the diverticulum. In front of the ureteral ridge on each side the bladder wall is thin and somewhat pouch-like, but no definite diverticula are present. The prostate measures 4½ cm. in width, 3 cm. in length, and 3 cm. in thickness. The lateral lobes press slightly against each other, and at the vesical orifice there is a very small but definite median bar, somewhat rounded in shape and with a shallow sulcus on each side. This lobe is elevated about 1 cm. above the surface of the trigone.

Résumé. Slightly hypertrophied prostate. Small median lobe. Greatly thickened and contracted bladder with three fairly large diverticula and four or five small diverticula and numerous intramuscular cellules. Thin pouch behind the trigone and in front of each ureteral ridge. Ureters pushed downward and forward by the diverticula which lie behind them. No great ureteral obstruction produced. Ureters slightly dilated, considerably thickened. Renal pelvis not dilated.

Pathological Report No. 6199. A longitudinal section has been taken from the outer portion of the larger diverticulum springing from the region of the left ureter. The epithelium is well preserved in places; fairly normal in appearance. Beneath it the submucosa is thin and shows much round

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and polynuclear celled infiltration. Beneath the submucosa there is a wide area of longitudinal bundles of connective tissue, and external to this, in places, are seen large masses of muscle bundles of smooth fibres cut transversely and obliquely. In some parts of the wall these are absent. The entire thickness is from 1½ to 2 mm. Fairly normal blood-vessels are abundant. Round-celled infiltration is very little present in the deeper layers.

CASE VIII. *Man, aged sixty-seven years. Two vesical diverticula, dependent on prostatic hypertrophy, causing flexion of ureters and obstruction by pressure; no operation; death from uræmia.*—J. B., aged sixty-seven years. Admitted to Prof. Halsted's service May, 13, 1904, complaining of frequency of urination. He had never had gonorrhœa or stricture, and gave no previous urinary history. Two years ago he began to have frequency and difficulty of urination, which has gradually increased until now he is voiding urine about every fifteen to thirty minutes. He has suffered with a dull aching pain in the suprapubic region, and a sharp stabbing pain in the penis. He has never had complete retention of urine, but has been using a catheter for the past three weeks. His health has been failing rapidly of late.

Examination. Weak-looking old man. Heart and lungs negative. Abdomen negative. The prostate by rectum is found to be moderately enlarged, smooth, and firm. A coudè catheter passes with ease, residual urine 640 c.c. removed. Urine very purulent. After two days in the hospital the patient became nauseated and mildly delirious. Retained catheter provided, and salt solution infusions given.

Cystoscopic Examination (five days later). The bladder is very dirty and irritable, rebelling at 100 c.c. of solution. A slight intravesical hypertrophy of the median and lateral portions of the prostate is present—the median enlargement being quite small. The vesical wall is moderately trabecu-

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lated, with numerous cellules between. The orifices of two definite diverticula are seen, one on the right lateral wall, about 2 cm. distant and external to the ureteral orifice, and the other in a corresponding position on the left side. The latter appears to be the larger of the two diverticula. Both ureters are easily seen. Symptoms of uræmia continued and gradually got worse until the patient died, May, 23, 1904.

Autopsy showed: Hypertrophy and dilatation of heart; arteriosclerosis, emphysema and chronic passive congestion of the lungs. Acute suppurative nephritis, hydroureter, hydronephrosis, diverticula of the bladder, enlarged prostate, etc. The kidneys, ureters, bladder, prostate, and a portion of the membranous urethra were removed in one piece.

The bladder was opened through a small incision in the anterior surface. Examination showed the presence of two diverticula and the incision was then closed by sutures and the bladder injected full of 5 per cent. solution of formalin through the urethra, which was then ligated. One month later the bladder was opened along the median line in front. Examination shows as follows: Prostate moderately hypertrophied, measuring 4½ cm. wide, 4½ cm. long, 4 cm. thick. Viewed from the interior of the bladder the prostatic orifice shows an enlargement "*en collarette*" with no pronounced intravesical outgrowth. The urethral orifice is almost round in shape. The median portion of the prostate is in the shape of a bar slightly rounded toward the bladder, and with a very shallow sulcus on each side; here it joins the lateral lobes. This bar elevates the prostate about 1 cm. above the level of the trigone. After opening the prostatic urethra along the middle line in front, the median bar is much more evident and the urethra considerably compressed from side to side by the lateral lobes. The interior of the bladder shows numerous trabeculations, which are most pronounced on the posterior surface; between these are numerous small cellules. The ureteral ridges and interureteral ligament are both quite prominent, and behind the

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trigone there is a pouch about 1 cm. deep in which the bladder wall is very thin. Above and to the outside of the left ureteral ridge is the opening, 2 cm. in diameter, of a diverticulum. This orifice is surrounded by a margin about 3 mm. thick. The diverticulum itself is about 5 cm. in diameter, and almost globular. Its walls are very thin and transmit light very easily. The lower anterior edge of the orifice of the diverticulum is about 2 cm. distant from where the ureteral ridge disappears. Viewed from the outside the diverticulum is found to extend forward about 2 cm. beyond the anterior edge of its orifice and to compress and push forward the ureter against the left lateral wall of the bladder. The ureter, therefore, in its course from the orifice upward, travels within the ureteral ridge for a distance of about 2 cm., then as it emerges from the bladder its course changes 90 degrees downward and outward, and from there it runs along the outer aspect of the diverticulum. The vesical orifice of the ureter is small, but as soon as it emerges from the bladder on the posterior surface it becomes immediately dilated to about 1½ cm. in diameter, and maintains this size up to the kidney (Fig. 13).

The kidney pelvis is considerably dilated, as are also the calices. The kidney itself is irregular and lobulated, but about normal in size. The left vas deferens is separated from the left ureter by the entire diverticulum, which has projected backward between the two. The vas deferens courses along the posterointernal aspect of the diverticulum, the ureter, the anteroexternal. On the posterior surface of the right side of the bladder a small diverticulum is seen occupying a position analogous to the right side. This diverticulum is about 2 cm. in diameter, globular in shape, and the ureter lies to the front and to the outside of its junction with the bladder, making two sharp turns in its course, one as it passes along the anterior aspect of the diverticulum and another where it joins the bladder. The ureteral orifice is small, but immediately above the bladder

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the ureter is dilated to the size of the left, about 1½ cm. in diameter. The orifice of the diverticulum is much smaller than that on the right side, being about 3 x 8 mm. in size. It lies about 2½ cm. behind and outside of the ureteral orifice and at a point about 1 cm. above where the ureteral ridge disappears in the bladder wall. The orifice is surrounded by an oval ring of thickened bladder muscle. In front and to the outside of the ureteral ridge, on each side, the bladder wall is very thin and pouch-like, especially on the right side, but it is not in the shape of a diverticulum and has no definite orifice. No diverticula present at the vertex of the bladder. The right kidney pelvis is dilated and the counterpart of the left kidney. (See photograph for posterior view of bladder and diverticulum.)

Remark. In this case there is definite prostatic hypertrophy with obstruction leading to trabeculation of the bladder and numerous intervening cellules and the diverticulum mentioned above. It is impossible to say that the prostatic obstruction has not been responsible for the dilated condition of the ureters, but the ureters are evidently compressed and deflected out of their normal course by the diverticula which caused both of them to be pushed forward and acutely flexed at their junction with the bladder. It seems quite probable that the dilation of the ureters is largely due to compression between the anterior wall of the diverticulum and bladder.

Pathological Report No. 6200. Longitudinal section of the outer portion of the wall of the larger diverticulum has been made. Measures about 1 mm. in thickness. The mucosa shows a very thin layer of epithelium with considerable round-celled infiltration in between the cells and submucosa. The greater part of the wall is composed of longitudinal layers of connective tissue, but external to this and separated by loose areolar tissue is a thin layer of smooth muscle fibres. In a small portion of the section the external layer of the section is fairly wide and bundles of

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smooth muscle fibres cut obliquely and transversely are to be seen.

CASE IX. *Male, aged twenty-two years; slight stricture of urethra—possibly a congenital valve; large diverticulum of bladder; no trabeculation; nephritis; anasarca; operation; decapsulation of both kidneys; great improvement; death from uræmia after two years; autopsy.*—C. H. L., aged twenty-two years, admitted to the Johns Hopkins Hospital Dispensary March 8, 1904, complaining of inflammation of the bladder.

Family History. Father died of Bright's disease.

Past History. Patient had gonorrhœa at the age of seventeen years, but it was cured by a two weeks' treatment. Gonorrhœa a second time seven months ago. This attack was characterized by frequency of urination, but was cured in three weeks. After that patient "was perfectly well."

On April 7, 1902, patient had entered hospital on account of dropsy, and of this admission the following notes were abstracted from the hospital records of Dr. Halsted's service: Intermittent attacks of dropsy since April 22, 1901 (etiology unexplained). Urine contained a large amount of albumin and casts. Anasarca improved by rest in bed and dietetics.

Operation April 22, 1902. (Dr. Halsted; ether.) Bilateral decapsulation of kidneys. Satisfactory convalescence. Discharged from hospital May 31, 1902. Continued improvement; no return of dropsy. Return of patient to his work. Tremendous benefit by operation.

Present Illness. On admission to dispensary March 8, 1904, patient said that he had begun to have an increased frequency and urgency of micturition five weeks before. Previous to that he "was perfectly well." One week after onset the patient noticed yellowish-white masses in the urine, and a week or two later bloody shreds, and occasionally bloody urine at the end of micturition. Soon after the hæmaturia appeared he began to suffer with a severe cramp-like pain, which began with micturition and increased in

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severity until about four minutes after the end of urination, when it was so intense as to double him up and to produce a desire to defecate. The pain also evinced itself in the perineum and in the lower back. Examination of the urine showed it to be cloudy with pus cells in all three glasses. Albumin was present in abundance.

Cystoscopic Examination. A slight stricture at the meatus and in the membranous portion was discovered, but it was easy to pass a catheter, and after washing out the bladder the cystoscope entered easily. The bladder wall was only slightly inflamed, its walls not trabeculated, ureters both functionating; prostatic orifice showed no evidence of prostatic obstruction. On the left lateral wall of the bladder at a point about 4 cm. from the left ureteral orifice was the opening, about 1 cm. in diameter, of a large diverticulum. Efforts to introduce the cystoscope into the orifice of the diverticulum were in vain. No other trabeculation or pouch formation.

Note. The patient seemed to suffer very little discomfort, only voiding urine at intervals of about six to eight hours, and without pain. Ureteral dilatations advised. After several weeks' treatment the stricture was pronounced cured, but the urine was still purulent and contained bacilli and at times cocci, casts, albumin in abundance, and only 2.5 grams of urea to the litre. The patient at that time felt well, urinated normally at normal intervals, and had no symptoms of uræmia.

In February, 1905, he was again admitted to the Johns Hopkins Hospital, where he died shortly of uræmia, etc.

Autopsy. The bladder, prostate, and penis have been removed in one piece. After being incised for inspection the bladder has been sewed up, and injected fully with formalin solution.

Examination shows a large bladder, attached to the left half of which is a large diverticulum measuring 8 x 10 x 10 cm. in size. Viewed from behind the diverticulum obscures

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the left half of the bladder, and the ureter and the vas deferens are seen along the posterior surface of the diverticulum. The vas deferens is greatly lengthened and drawn out and its course along the diverticulum measures 24 cm. The left vas deferens is pushed downward and backward by the diverticulum. The left ureter is considerably dilated and thickened, is pushed downward and forward near its junction with the bladder, thus making an acute bend at that point, so that it is impossible to pass a probe from above downward into the bladder. There is no diverticulum upon the right side. The bladder wall is found to be greatly thickened, measuring from 8 mm. to 1½ cm. in thickness. Its cavity is large, holding 250 c.c. The mucous membrane shows chronic inflammation. There is practically no trabeculation and no intramuscular and perivesical cellules —no pouches.

The trigone is remarkably atrophic. The ureteral ridges are absent; there is no intraureteral ligament. The ureteral orifices lie about 3 cm. distant from each other and 3½ cm. from the prostatic orifice. A probe easily passes up the right ureter, but in the left ureter the probe passes only about 1½ cm., when an acute flexure of the ureter is met with, which requires considerable manipulation to get the probe past. This flexure is produced by the large diverticulum which pushes the juxtavesical portion of the ureter downward and forward, making an acute bend at its bladder juncture (Fig. 14). The orifice of the diverticulum, which is 1½ cm. in diameter, lies about the middle of the left lateral wall of the bladder and distant 4½ cm. from the left ureteral orifice. The orifice is almost perfectly round, and the ring of muscle surrounding it is little, if at all, hypertrophied. The diverticulum is flattened against the side of the bladder, the septum dividing the two being about 1 cm. thick.

Both ureters are slightly and equally dilated. The prostate is normal in size, measuring 3½ cm. in width, 2½ cm. in length, and about 2 cm. in thickness. The vesical prostatic orifice

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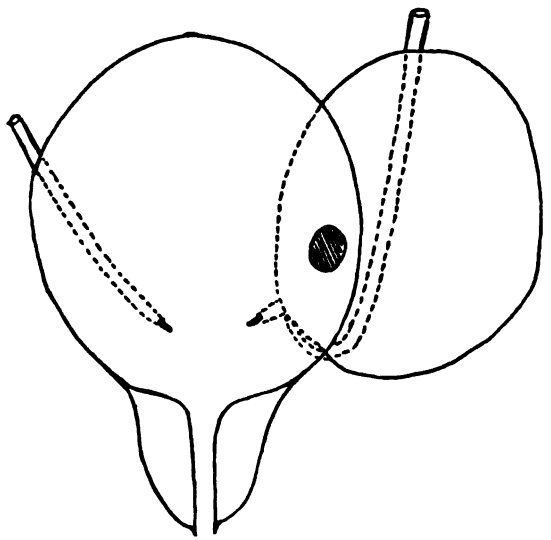
Fig. 14



Showing large diverticulum of left wall of bladder, causing displacement and flexion of ureter.

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shows no enlargement or obstruction. When opened in front the urethra shows a very peculiar bridle-like process of mucous membrane which runs downward from the veru montanum to the anterior wall of the ureter for a distance of about 1 cm. From the point of its juncture with the urethra is another round ligament-like string which runs downward and is attached to the floor of the urethra at a point about 1½ cm. from the veru montanum, this being also about 1 cm. in length. The urethra is therefore divided into two passage-ways at the veru montanum, one to the left, which is normal in appearance, and the other to the right, which looks like an aperture produced by an instrument which has broken through a valvular septum. It seems probable that before instrumentation was performed a valve-like process extended downward and forward from the veru montanum through the right side of the urethra, and that this had been ruptured by instrumentation. Along the bulbous urethra there are several small, pouch-like depressions, one of which has a definite orifice. Nothing simulating the site of a definite stricture is to be seen.

Pathological report of microscopic examination of a section of the wall of diverticulum taken from a portion distant from the bladder: The wall is about 3 mm. thick, and contains considerable smooth muscle, the bundles of which run in various directions. The mucosa shows great round-cell infiltration and the epithelium is often absent.

Resume of the Cases.

Etiology. Four of the 9 cases reported above were young men (group *A*, seventeen, twenty-two, thirty, and thirty-four years), while the other 5 were past middle life (group *B*, forty-seven, sixty-three, sixty-six, sixty-seven, and eighty-five years).

In group *A* we find stricture of the urethra present as a possible causative factor in 2 cases (IV. and IX.), though it

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was never severe or of very small calibre in either case, and was promptly and easily cured by dilatation. In one of these (Case IX.) the autopsy showed a valve-like process of mucous membrane in the prostatic urethra which was probably congenital, and may have been responsible for the large, single diverticulum which was present. The absence of trabeculation in the vesical wall and of other evidences of obstruction would, however, suggest that the diverticulum was itself congenital.

In Case IV. the symptoms suggest the presence of peri-vesical abscess which ruptured into the bladder. The very dense adhesions which surrounded it also suggest that, but the fact that it was lined with mucous membrane is against it, unless it be possible for the vesical epithelium to grow into and eventually line completely the wall of an old abscess cavity which could not collapse owing to adhesions to surrounding structures (pelvic wall). On the other hand, the fact that the ureter opened into the diverticulum is given by Englisch[1] as proof that it was congenital, but with this idea I do not agree, as it would seem very easy for a ureter to be drawn into the orifice by a growing diverticulum.

In Case II., aged thirty years, no obstruction of any sort had been present, and in Case V., aged thirty-four years, the diverticulum was apparently produced by the fall from a locomotive, though a urachus, patent for a certain distance above its vesical end, might have been present since birth.

It is therefore probable that the diverticula of some of this group of young men, and possibly all, were of congenital origin.

In group *B* prostatic obstruction was present in all cases, but it is interesting to note that the enlargement was very slight, and almost entirely confined to a small median bar in all but one case. The short duration of all urinary symptoms was striking in several cases, particularly in Case I., in which seven large diverticulæ were found at autopsy, although the patient had felt well up to four months of his

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death. On the other hand, in Case III., although the prostate showed practically no enlargement, dysuria had been present for twenty years.

Pathology and Symptomatology. In group *A* only one diverticulum was present in 3 cases (II., V., IX.), twice in the region of the urachus, once on the left lateral wall. The vesical wall was not trabeculated in either of these cases, and the diverticulum was probably congenital. In Case V. the diverticulum had given symptoms (intermittent spasmodic painful seizures) after a fall four years before.

Case IX. had normal urination until five weeks before. After that, frequent urination associated with acute cystitis was present. In Case IV. two diverticula, one pouch, and several prominent ridges of mucous membrane were present, but no definite trabeculation, and no cellules were found, and the appearance was not that of a bladder which had been on tension.

In two cases the ureter was pushed out of its normal course, in one case its orifice drawn into the diverticulum (IV.), and in the other acutely flexed at its vesical juncture (IX.). In Case IV. symptoms of renal obstruction existed, and in the other a dilated ureter was found at autopsy.

Sections of the diverticular wall showed microscopically a thick layer of smooth muscle outside of the submucosa in all these cases.

In Case V. the diverticulum was small and narrow and lay within the urachus, but in Case II., which had its orifice also at the vertex of the bladder, but was not operated, the diverticular capacity must have been several hundred c.c. Both of these cases were characterized by intermittent seizures of pain due to temporary occlusion of the orifices of the diverticula. During such attacks the distended diverticulum was palpable, at other times not.

The two cases which were operated (IV., V.) have been cured.

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cases it was much thicker. None of our diverticula showed an entire absence of muscle. We cannot, therefore, agree with Englisch's assertion that muscle is not present in the walls of acquired diverticula.

The Literature. In order to give the experience and opinion of other operators, I have studied carefully most of the literature pertaining to vesical diverticula. In the early literature we find good descriptions of the condition by Cruveilhier, Morgagni, Meckel, and others. Later on Civiale has studied the subject very carefully, and in the *Transactions of the Pathological Society of London* we find numerous references to vesical diverticula.

Most of these are melancholy records of cases with obscure urinary symptoms which have been cleared up on the post-mortem table. They furnish, however, many extraordinary specimens of diverticula, and the numerous complications which may be produced by them. Time forbids my giving even brief references to these cases. The most common and fatal complications have been dilatation of the ureter and kidney by pressure of the diverticulum against the ureter near its bladder juncture, encysted calculi, and severe inflammation of the bladder and of the diverticulum (case of Hofmokl[2]) leading to perivesical abscess (case of White[3]), peritonitis as in the case of Shaw, and thrombosis of the femoral vein with inflammatory adhesion to the diverticulum as in the case of Murchison.[4] Fargett[5] has called attention to the frequent occurrence of vesical neoplasm about the orifices or in the cavities of diverticula.

My own case shows the frequency of ureteral displacement and obstruction by the growth of diverticula and the serious results therefrom upon the kidneys.

Treatment. Catheterization. While numerous authors have advised the use of the catheter to evacuate the urine when retention is complete or to empty the diverticula of the stagnant urine and thus prevent the formation of calculi, and severe inflammation, I have yet to find recorded successful

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results with this method of treatment. Most cases have come to speedy death. My Case III. was fairly successful in the use of the catheter for three years, but it then became such a burden from the frequency required, and the pain produced, that he begged for operative relief.

If, therefore, the patient has arrived at a stage where relief is necessary, it must, in my opinion, be something better than the catheter.

Drainage. Suprapubic cystostomy for drainage may be employed, although I can find no successful case reported. It would seem to be the simplest procedure for very weak individuals, but diverticula, being weak in muscle, have no power of voluntary contraction; so that it is difficult to drain them satisfactorily.

Perineal drainage was employed by Burkhardt, but his patient died.

Enlargement of the Orifice. This has been done frequently in order to remove encysted calculi too large to be extracted through the diverticular orifice, but we can find only one recorded case (by Lennander) where the operator deliberately divided the septum between the bladder and the diverticulum for the cure of the latter. This patient, a boy aged twenty-one months, was operated on on account of a severe phimosis, with dribbling of urine. After operation, complete retention set in, and he had to be catheterized. Cystitis supervened and catheterization afforded so little relief that suprapubic cystostomy was performed, and a large diverticulum with an orifice near the left ureter detected. Lennander passed a strong silk suture through the septum and out of the orifice, and tied it tightly with the hope that it would cut through the dividing walls and enlarge the diverticular orifice. This did not occur, however, and, at a second operation, he removed the ligature and in its place inserted a strong forceps, which was left in place and gradually tightened until an opening between the bladder and diverticulum, 10 cm. long, was made. The boy ulti-

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mately died, however, and autopsy showed abscess of left kidney which had two ureters, one of which opened into the bladder, and the other into the diverticulum.

Case III. of my series is, as far as I know, the only case in which the dividing walls were incised and their cut edges united by suture, and also in which a successful result followed. In most instances the diverticulum is firmly attached to the bladder only by its neck around the orifice, and the adjacent external surfaces of bladder and diverticulum are merely coapted and loosely bound by fibrous tissue, and do not form a solid septum; so that extensive incision without suture would probably be very dangerous owing to the possibility of perivesical extravasation of urine occurring.

But the result obtained in my case is hardly such as to recommend the method, for while voluntary micturition has been restored, a residual urine of 300 c.c. remains and necessitates the use of a catheter at bed-time.

Suture of the Orifice without Excision of Diverticulum. Pousson[8] has recommended this procedure and carried it out in one case. His patient, aged sixty-six years, suffered from enlarged prostate. Suprapubic cystostomy was performed, three calculi removed from the bladder, and a median prostatic enlargement excised.

Examination then showed a diverticulum with a very small orifice on the right side of the bladder about 2 cm. distant from the ureteral orifice; the cavity of the diverticulum was about the size of a walnut and contained a small calculus. Pousson curetted thoroughly the mucosa of the diverticulum, freshened the margin of the orifice with scissors, and then closed it with three sutures of catgut. A retained catheter was placed in the urethra and the suprapubic vesical incision closed tight. The patient left the hospital in a month, with urination normal at intervals of three to four hours. "Six weeks after the operation the cystoscope showed that the sutured orifice had healed, the mucosa being wrinkled and

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white like a cicatrix." Before operation the urine is said to have been very purulent; after operation clear.

This method caused considerable unfavorable discussion. To deliberately close off a large extravesical sac without leaving any avenue of escape for the contained fluid, even if it is sterile, certainly seems a very dangerous procedure, and I cannot believe that such an operation can ever be permanently successful in curing a diverticulum. Considering the extreme thinness of some of the diverticular walls in my cases, the curettage itself would appear to be very dangerous.

Unfortunately (or probably fortunately) no other cases have been operated by Pousson's method.

Anastomosis between Diverticulum and Bladder. This method, which can rarely be applicable, was carried out by Ljungren[9] in a remarkable case. A boy, aged twelve years, had for three years had intermittent attacks of pain in the abdomen, associated with vomiting. During the attacks there was an elastic tumor the size of a child's head palpable in the region above the bladder, which was not influenced by catheterization. Laparotomy showed a fluctuating tumor lying back of the bladder and extending up to the umbilicus. The sac was found to contain urine and abdominal drainage was therefore applied. After that urine came both from the fistula and from the urethra, and it was impossible to force a colored fluid into the bladder from the fistula. Later an anastomosis between the "anterior and posterior bladders" was performed, and coincidently the orifice of the left ureter was shown to open into the posterior bladder, which was prolonged into a "blind" funnel behind the "anterior" bladder. "The patient was cured."

It seems certain from the history of intermittent reappearance of the supravesical tumor that a communication between the "two bladders" was present, but that it beeame closed off during the attacks as in my Case II. What this closure was due to was also impossible to show in my case. In

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Ljungren's case an inflammation of the diverticulum following the operation might easily explain the failure of re-establishment of the communication. Cystoscopy would probably have shown a diverticular orifice in the left half of the trigone.

This procedure has little to recommend it, as it would probably have been possible to remove the diverticulum without having to cut off the ureter or transplant it, as was done in my Case IV. (a continuation of the mucosa surrounding the ureteral orifice being preserved down to the vesical orifice, and the sutures so placed as to bring this strip with the ureteral orifice into the vesical wound while closing it).

Complete Excision of Diverticula. Diverticula have been treated by complete excision eight times, viz., by Pean in 1895; Czerny, 1896; Riedel, 1903; Pagenstecher, von Eiselburg, 1904; Young (3 cases), 1904. All of my cases were operated in January and February, 1904, before I had seen reports of other cases. The methods employed have been so varied that I shall give each of the cases in detail.

1. Pean's[10] Case. *Supernumerary urethra and bladder in girl, aged fifteen years; excision; cure.* The patient complained of incontinence of urine. Examination showed two urethræ, one of which led into a diverticulum which communicated with the bladder by a small orifice and did not contain a ureter. By incision along the anterior wall of the vagina, Pean was able to excise the supernumerary tract and close the communication with the bladder. The patient made a good recovery and was cured.

2. Czerny's[11] Case. *Large diverticulum in a young man; suprapubic excision; transplantation of ureter; subsequent nephrectomy; improved.* A man, aged thirty-one years, who had never had any previous urinary trouble, developed stricture of the membranous urethra, retention of urine, was catheterized, and cystitis resulted.

When seen by Czerny examination showed great tenderness in the region of the left kidney, and, on the left side of the bladder, a tumor the size of a child's fist. After the

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bladder had been emptied by catheter, pressure upon this tumor caused more urine to flow out.

The bladder was explored suprapubically with the following result: The bladder was situated high up, greatly thickened, and its upper end was prolonged toward the navel and about the size of a finger, being compressed by a diverticulum about the size of a fist which communicated with the bladder by an opening near the left ureteral orifice. The diverticulum filled the small pelvis and contained very nasty urine. After suprapubic drainage for two weeks the suppuration still continued and excision of the diverticulum was decided on. A transverse incision was made through the right rectus muscle, the diverticulum exposed, and the bladder opened. The operator encountered numerous adhesions which were difficult to free, particularly on the posterior surface next to the rectum and in the sacral fossa. The peritoneum and left ejaculatory duct were injured. The left ureter, which was the size of the finger, penetrated the posterior wall of the diverticulum obliquely. It was cut off and, after the diverticular neck had been cut away from the bladder, was transplanted into the vesical opening and the latter sutured from within. The excised diverticulum was as round as a ball, and measured 10.5 x 9 cm. The wall was thick and composed of many layers of muscle. It was lined by epithelium, and ulcerated in places. The orifice was 2 cm. wide. "The effect of the diverticulum upon the bladder was to twist it on a vertical axis forward and to the right."

Convalescence. The wound suppurated profusely, the sutures broke down, and a ureteroabdominal urinary fistula resulted. Four months later it was necessary to extirpate the left kidney on account of pyonephrosis. After that the patient recovered slowly, and the final result was urination at intervals of two to three hours, and a bladder holding 150 c.c.

3. Riedel's[12] Case. *Enlarged prostate; prostatectomy; return of obstruction; perineal drainage; pain about bladder;*

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suprapubic excision of large diverticulum; death. Man, aged sixty-one years, admitted December 20, 1902, complaining of catheterism. Prostate found enlarged. Prostatectomy (perineal?) performed, the two lateral lobes being enucleated. Result good.

Second admission May 22, 1903. Pain on left side above Poupart's ligament, prostate small, but urination impossible.

Second Operation. Perineal urethrotomy, drainage through tube for eight days. Improvement for a short time, then return of pain on left side above bladder.

Third Operation, June 13th. Suprapubic cystotomy; discovery of a colossal diverticulum on right side, communicating with bladder by a large opening. The bladder wound was then sewed up, the patient placed in Trendelenberg's position, transverse incision made through the right rectus muscle, and a diverticulum of the size of two fists exposed. After separation from the peritoneum covering it, the diverticulum was dissected out and the bladder closed. The patient died of collapse on the following day.

Autopsy showed tuberculosis of both lungs. Sclerotic kidneys; a wound in the bladder 35 cm. long just above the ureteral orifice on the right side.

4. Pagenstecher's [12] Case. *Onset of difficulty of urination without apparent cause; suprapubic cystotomy; discovery of large diverticulum; second operation; excision of diverticulum through sacral route; result, sacral urinary fistula.* Man, aged thirty-three years; formerly entirely healthy. During the past winter he suffered for two or three days with pain in his bladder on urinating. After four or five weeks there was a return of pain, with frequency of urination and straining at stool every half-hour. The bladder was catheterized and washed out for a time by his physician.

Examination. Patient has fever from 39° to 40° in the evening. Frequent severe straining at urination, with pain toward the testicles and in both groins. On the right side above the symphysis a full bladder is to be felt. After the

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bladder has been apparently emptied by a rubber catheter, a metal catheter, after passing a small obstruction, withdraws dark, bloody urine.

Cystoscopic examination was unsuccessful, and suprapubic operation was done for exploration on August 30, 1903. The bladder wall was very thick, and in the region of the left ureteral orifice an opening about the size of a finger was felt. The diverticulum extended back to the sacrum and outward to the edge of the pelvis, at which point there was a septum containing a large, pulsating vessel. After several days of drainage and irrigation it was determined (cystoscopically ?) that the right ureter opened into the normal bladder. The diverticulum opened in the place of the left ureter. In the wall separating the bladder from the diverticulum one could feel a cord, evidently the ureter. A rubber catheter which had been passed into the urethra fell of itself into the opening of the diverticulum. Since no improvement followed drainage, sacral extirpation of the diverticulum was decided upon and carried out on September 16th. The patient was placed upon his right side, a V-shaped incision made, and a temporary resection of the sacrum performed. The rectum was pushed toward the right, the wall of the diverticulum recognized by palpation of a bougie within it, and exposed after division of the fascia immediately next to the rectum. No large vessels were encountered, but the adhesions were very marked, and the operation extremely difficult and prolonged. The peritoneum was shoved back without injury, likewise the bladder, which was quite adherent to the diverticulum along the dividing wall.

In the wall of the diverticulum there ran two cords, one a vessel and the other a ureter which opened into the diverticular wall, and had to be cut off. The mouth of the diverticulum was the last removed, and the ureter which had been isolated for quite a distance was implanted at the site of the diverticular orifice, the bladder muscle being sutured around it.

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The wound was packed, the sacrum replaced, and a retained catheter placed in the urethra.

The specimen removed showed that the ureter ran for a distance of 5 cm. through the walls of the diverticulum, and opened into the diverticulum near its opening into the bladder. The diverticulum in its contracted condition was about the size of an apple. Its walls showed the same structure as the bladder wall—bundles of smooth muscle fibres in longitudinal and transverse section. Following the operation there was a severe collapse, followed by fever. On the fourth day the gauze packing was removed and the wound looked good, but on the next day urine escaped from the wound. Suprapubic and sacral fistulas persisted for some time. Epididymitis set in. In December the patient was out of bed by day, but he could not urinate through the urethra while standing up. The sacral wound was so painful that it was impossible for the patient to sit down; later the sacral fistula opened again.

' On February 14th the following note was made: Patient urinates every three or four hours spontaneously. The urine is still cloudy, the posterior fistula is healed, but he suffers severe pain in the left side of his body. The suprapubic fistula is healed.

Cystoscopic examination shows the mucous membrane of the right side trabecular and on the left side smooth. In the region of the ureteral implantation a dirty, mucus-covered place is seen, but the opening is not visible. In March the fistula broke down again, but the patient was said to be free from pain and to urinate only seldom. Urine escapes from the fistula only during urination. No note made as to the condition of the prostate nor regarding the present stricture of the urethra.

5. Von Eiselberg's [14] Case. This case was mentioned by von Eiselberg in the discussion of Pagenstecher's paper before the German Surgical Congress, 1904. The *Transactions* of this Society have not yet appeared in this country,

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and I can only find a brief reference by Pagenstecher, who says that a small congenital diverticulum of the vertex of the bladder was excised. The patient presumably recovered.

6. Author's[15] Case IV. (given in detail above). Male, aged thirty years. One large and one small diverticulum. Right ureter ending in large diverticulum. Renal symptoms, right side. Operation. Suprapubic excision of both diverticula. Plastic procedure with mucous membrane around ureteral orifice to avoid transplantation. Extravesical closure of both wounds. Persistency of suprapubic fistula. Bottini operation for relief of prostatic bar. Prompt healing of suprapubic fistula. Normal urination at intervals of five hours one year after operation.

7. Author's Case V. Male, aged thirty-four years, had intermittent colicky pain in hypogastric region for four years. Cystoscopic discovery of small diverticulum in region of urachus. Suprapubic excision. Suture of bladder. No leakage. Cure. Complete disappearance of attacks of colicky pain.

8. Author's Case VI. Male, aged sixty-three years. Enlarged prostate; residual urine 1200 c.c. Mass in right inguinal region. Cystoscopic discovery of large diverticulum with small orifice on right side of anterior wall of bladder. Suprapubic extravesical extraperitoneal enucleation of diverticulum, division at vesical juncture, and suture of orifice. Perineal prostatectomy; enucleation of two lateral lobes.

Result. No leakage. Complete relief of prostatic obstruction. Patient left hospital on the twenty-seventh day. One year later: Normal urination; no residual urine. Cystoscope shows no return of diverticulum; patient well.

Operation to Remove Urethral Obstruction Without Attempting to Attack the Diverticula.

While I find no definite cases of this kind reported in the literature, many have undoubtedly occurred in conjunction

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with enlarged prostate in which prostatectomy, or the Bottini operation, has been performed. I have had a great many cases in which diverticula were present, but in which they caused no symptoms and were not of threatening character, where I was content to remove the prostatic obstruction, and have been gratified to find that the diverticula have given no trouble and have apparently gradually diminished in size. Where definite obstruction is present and the diverticulum not threatening, one should always try at first the operation for removal of that obstruction (urethrotomy or prostatectomy), but that cases will be found in which this will not suffice is shown by the cases which I have recorded.

Résumé.—A comparison of the operative results shows that extravesical enucleation of the diverticulum through a median suprapubic incision without opening the bladder is the method of choice. Where it is necessary to open the bladder, intravesical enucleation by the method employed on the smaller diverticulum in Case IV. is unquestionably the simplest. It may not be possible to use this in all cases, but it is worthy of trial. It is important to find the best layer of cleavage in enucleating the sac if it is very adherent to surrounding structures. The enucleation is thus greatly simplified and much hemorrhage avoided. Great care must be taken not to injure the ureter by selecting a superficial layer for enucleation when adjacent to the ureter. If the ureter opens into the diverticulum, it should not be necessary to divide and transplant it, as done by Czerny and Pagenstecher, but a flap of mucous membrane should be preserved around its orifice and drawn into the vesical opening, as done in Case IV. In this way the natural valve-like ureteral orifice is preserved and ascending renal infection avoided.

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CONSERVATIVE PERINEAL PROSTATECTOMY.

THE RESULTS OF TWO YEARS' EXPERIENCE AND THE REPORT OF SEVENTY-FIVE CASES.

BY HUGH H. YOUNG, M.D.,
Baltimore, Md.

THE time seems to be ripe for a study of results, and it is my intention to-day to give you a summary of the results obtained by prostatectomy through the perineal route by the technique previously described by me.[1]

In these papers the technique of the operation has been so fully detailed that I will not tire you by a repetition of its various steps. Suffice it to say that the enucleation of the prostatic lobes is accomplished as shown in the accompanying drawings: Fig. 1 shows the inverted V cutaneous incision, each branch of which is about two inches long. This incision is simply carried through the fat and superficial fascia, the remainder of the operation proceeding by blunt dissection with the finger or handle of the scalpel, with the exception of those median-line structures, the central tendon and rectourethralis muscle, which require division. In this way the posterior surface of the prostate is exposed with no more injury than through a median perineal incision, and one has the great advantage of being able to retract the rectum much better, thus giving a much closer and wider exposure of

[1] Journal of the American Medical Association, October 24, 1903; February 4, 1905; Monatsberichte für Urologie, 1904, Bd. ix., Heft 5 u. 6.

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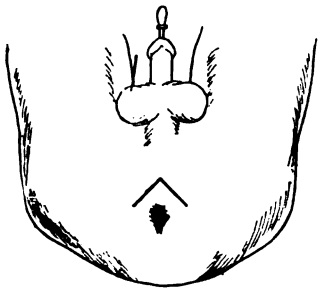
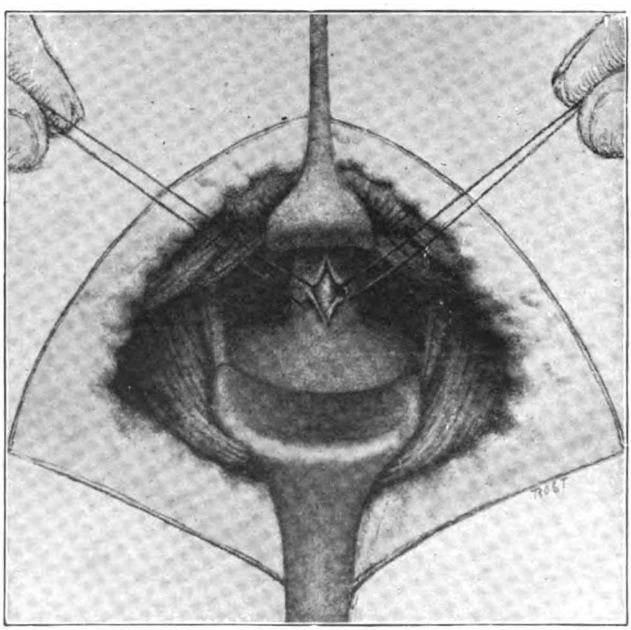
FIG. 1



The inverted V-incision.

FIG. 2



Incision of membranous urethra for introduction of tractor

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FIG. 3

Prostatic tractor closed for insertion.

FIG. 4

Tractor opened out (as after introduction).

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the prostate. The technique is not an "extensive dissection of the perineum" at all. Indeed, no important muscles are divided, and the wound heals as rapidly as a median one; in fact, it is the same, with the exception of the cutaneous portion.

Fig. 2 shows the retraction of the rectum, the exposure of the membranous urethra behind the triangular ligament, and the urethrotomy, performed on a grooved staff preparatory to the introduction of the tractor (Fig. 3). Great care should be taken to engage with sutures (or, better, with artery forceps) the mucous membrane of the urethra before attempting to introduce the tractor. After its introduction into the bladder the blades are opened out (Fig. 4) and traction made, as shown in Fig. 5, thus bringing the prostate down into the wound, so that its posterior surface is presented. The capsular incisions, which are made so as to leave the "median ejaculatory portion" undisturbed, as shown in Fig. 5, should be made about one and one-half centimetres deep, after which the external enucleation of the capsule (Fig. 6) and the internal enucleation of the urethra from the lateral lobes can be carried out with a blunt dissector. After the capsule and urethra have been thoroughly freed from the lobes, the deeper enucleation can best be done with the index-finger. In this procedure the tractor is often of the greatest service in drawing the prostate well into the wound, marking out the course of the urethra, and indicating when the enucleating finger approaches the vesical mucous membrane. The fenestrated blade is so easily palpated through the mucous membrane when the intravesical portion of a lateral lobe is reached, that one is at once placed on his guard and should rarely make a tear in the thin mucous membrane covering it. I now find the lobe forceps, shown in Fig. 6, rarely necessary for the enucleation of lateral lobes, the tractor and finger generally sufficing. The use of ordinary forceps on the lateral lobes with traction generally leads to tearing them into multiple pieces. Each lobe should be

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removed in one piece if possible. Morcellement is nearly always a poor technique to employ, and unnecessary.

If a median lobe or bar is present, it can generally be removed by engaging it with one blade of the tractor, making traction and rotating at the same time. This will generally cause the lobe to present in the left lateral cavity (Fig. 7), where it can be engaged with the small lobe forceps, or, if it is too small for these, by some small-toothed forceps, and enucleated or cut away with scissors.

If it is too small to be engaged with the blade of the tractor, this instrument may be removed and the index finger of the left hand inserted through the dilated urethra and used as a tractor, as shown in Fig. 8.

In certain cases in which a fibrous median bar or lobe is impossible to remove by the technique described above (in which every effort has been directed to leave the "ejaculatory bridge" undisturbed), it may be necessary to deliberately cut through the capsule covering the ejaculatory ducts, and thus expose and enucleate or excise the median prostatic enlargement, as shown in Fig. 9. This can be done without cutting into or removing the urethral floor. The objections to this method are that it destroys the ejaculatory ducts and leaves the torn ends of the vasa deferentia opening into the wound, which nearly always becomes suppurative in a few days, thus inviting an ascending infection, epididymitis, etc.

I feel sure that the frequent occurrence of epididymitis in the cases of Albarran, Murphy, and others, is due to the fact that the ducts are destroyed, and their natural protective valve-like urethral orifices replaced by patent torn ends of the vasa opening into a suppurative cavity.

If a vesical calculus is present, it can be removed without tearing away the urethral mucous membrane by simply dividing the lateral wall of the urethra and dilating the vesical neck, as shown in Fig. 10. In this way I removed a stone measuring two inches in diameter (Fig. 11). Although unnecessary, the divided urethral wall was sutured in his case.

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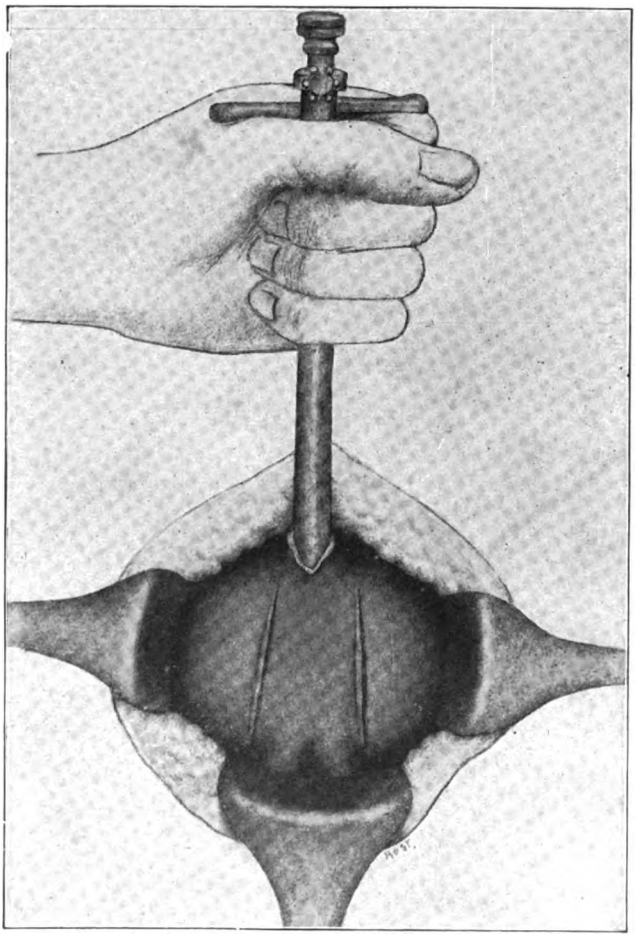
FIG. 5



The prostate drawn down by tractor.

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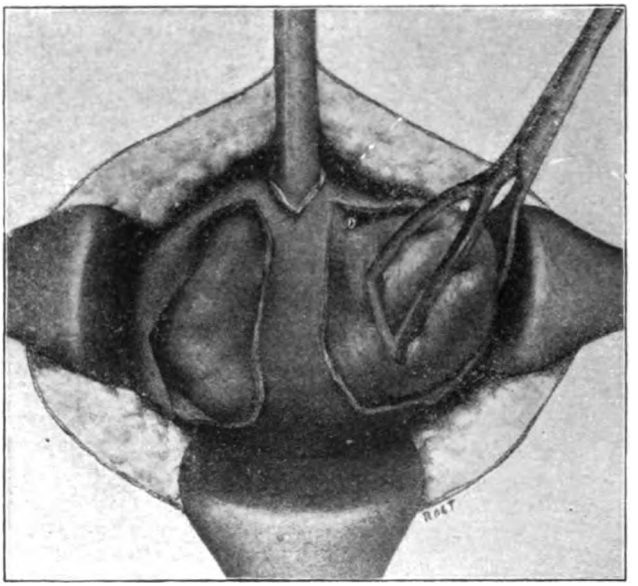
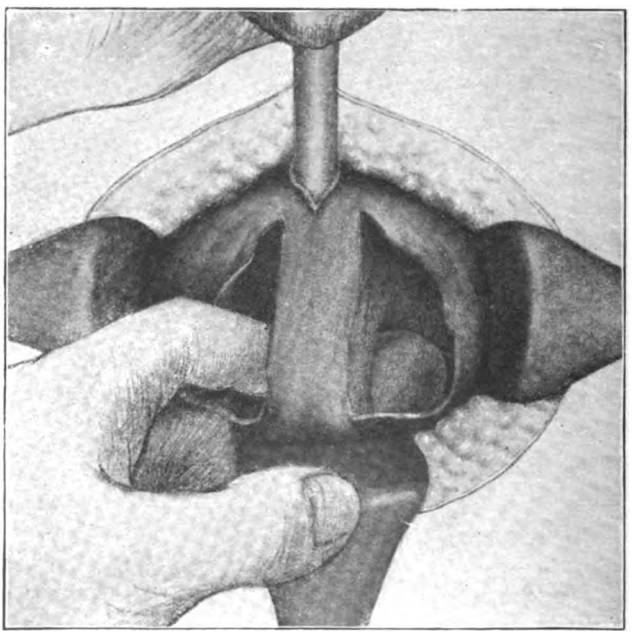
FIG. 6



The enucleation of lateral lobes.

FIG. 7



Delivery of the middle lobe into left lateral cavity.

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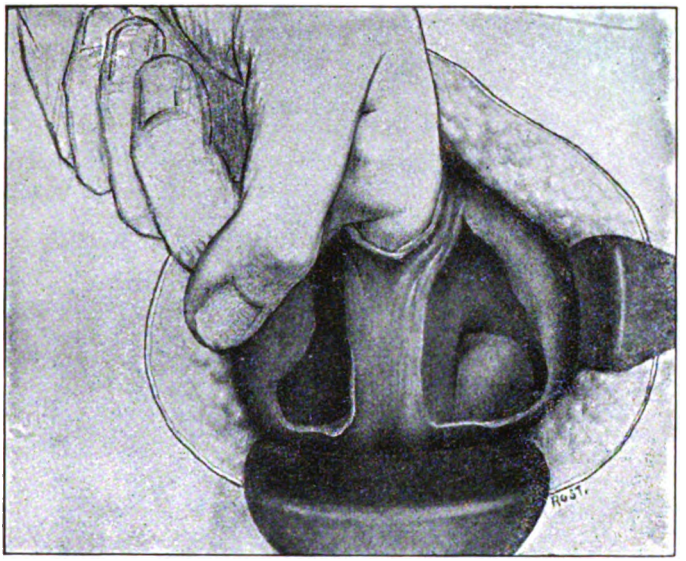
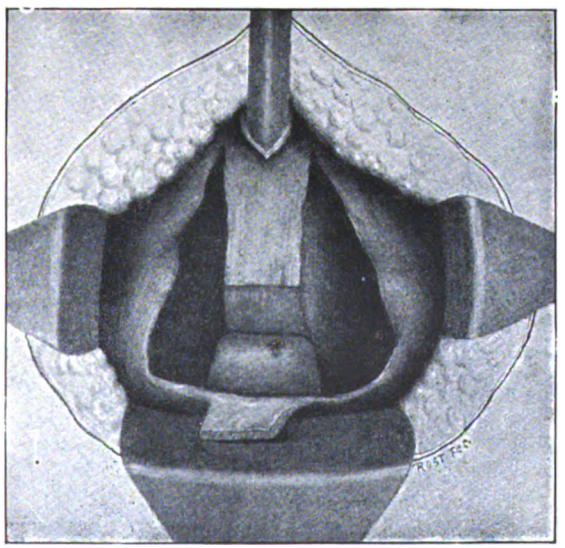
Fig 8



The use of index finger to deliver a small median lobe into lateral cavity.

Fig. 9



Division of "ejaculatory bridge," suburethral enucleation of median bar

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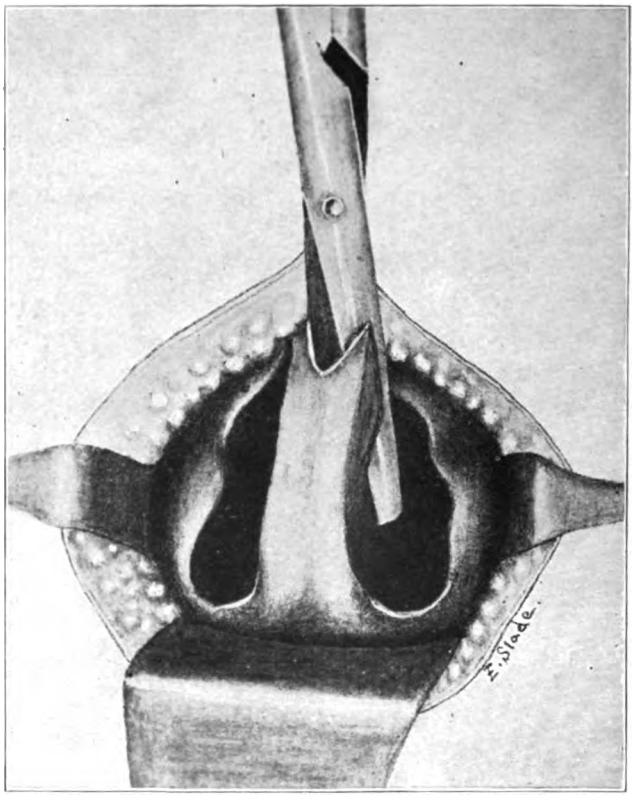
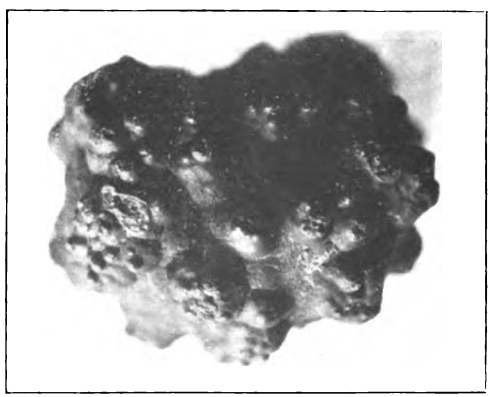
FIG 10



Division of lateral wall of urethra to allow extraction of large calculus through left lateral cavity.

FIG. 11



Photograph of stone (natural size) removed through lateral cavity.

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In some cases simple dilatation of the prostatic urethra will suffice for the insertion of forceps and the removal of the stone.

After completion of the operation upon the prostate, a double drain (two catheters tied together) is inserted into the bladder, fastened by a suture at the apex of the skin wound, and continuous irrigation begun. The lateral cavities are packed with gauze, but no extracapsular packing used.

The index finger of the right hand encased in a rubber glove is then inserted into the rectum, and its anterior wall examined by palpation with the other index finger. If the operator has been careful to divide the rectourethralis muscle, and to hug the membranous urethra and capsule of the prostate, no injury should be found. It is nevertheless advisable to support the naturally thin rectal wall by drawing together the separated edges of the levator ani muscles, which form its normal covering. Only one catgut suture is necessary to thus restore the perineum and keep the rectum from being pressed upon by the packing, which is removed on the second day along with the tubes.

The after-treatment consists in abundance of water by mouth (or infusion), getting the patient out of bed as soon as possible, and avoidance of instrumentation.

Results. During the past two years I have operated by this method 75 cases. Their ages were as follows: Over eighty years, 4 (eighty-one, eighty-two, eighty-two, eighty-seven years); between seventy and seventy-nine years, 23; between sixty and sixty-nine years, 29; between fifty and fifty-nine years, 14; under fifty years, 5.

Mortality. Among these 75 cases there were no deaths definitely attributable to the operation, in that all reacted well and convalesced satisfactorily for at least two weeks after the operation. I believe, however, that all deaths should be included, and therefore place in the mortality column the four deaths which have occurred.

CASE I.—Man, aged eighty-one years, entered the hospital with a bladder holding about three litres; could not be

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catheterized; was aspirated for four days; perineal prostatectomy then performed, with satisfactory convalescence for three weeks. After that the patient gradually became uræmic and died five weeks after the operation.

Case II.—Man, aged seventy-two years, in good condition. Perineal prostatectomy; reacted well; out of bed and walking in a week; fistula closed under two weeks, and patient ready to go home. On fourteenth day patient in excellent condition, voiding urine naturally. High enema given on account of constipation; immediately afterward sinking spell and death in a few minutes. Autopsy revealed pulmonary embolism. Bladder and kidneys in good condition.

Case III.—Man, aged seventy-six years, entered hospital with complete retention, nausea, vomiting, high fever. Had had nausea, vomiting, and symptoms of chronic uræmia for six months. Catheterization and drainage for about ten days, and condition improved somewhat. Perineal prostatectomy; reacted well; after a few days recurrence of nausea, vomiting, inability to take nourishment for two weeks. Death. Autopsy; double pyohydronephrosis; ureters dilated to size of thumb.

Case IV.—Man, aged eighty-seven years. Very large prostate; patient in good condition. Perineal prostatectomy; patient reacted well. Walking during the second week; temperature normal; convalescence good. Sudden development of cough and fever; signs of bronchitis on twenty-first day after operation. Transferred to medical department. Rapid spread of consolidation; death on the twenty-fifth day.

In reviewing these cases I feel satisfied that no other treatment could have saved Cases I. and III., and that in Cases II. and IV. the operation contributed only indirectly to the development of the fatal disease.

Should the rule of one well-known prostatectomist "not to include patients dying after six days" be accepted as the criterion, I might here claim no mortality. I feel, however, that it is only right to include all cases. This series shows

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that the operation itself is practically free from mortality, other than such accidents as might follow any operation.

Restoration of Voluntary Urination. Even when the catheter had been used for years, these patients are now able to void urine naturally in all cases. In only 2 of the 75 cases is there residual urine of any consequence, in both of which about 300 c.c. still remain after urination. Of the other cases the highest amount obtained now by catheter is about 30 c.c.

The obstruction may be said to have been completely removed in all cases but these 2. In 1 of these the cystoscope shows a small transverse fold of mucous membrane in the median portion of the prostate; in the other a small, rounded, intraurethral lobule is to be seen. In both of these cases greater care at the operation would probably have detected and removed these obstructions; so that it may justly be said that normal free urination can and should always be established after the operation. In a number of cases cystitis and contracture of the bladder exist, and more or less frequent urination is the result. These cases can probably be cured by hydraulic dilatation. If an unusual frequency of micturition is present after operation, the patient should not be discharged without an investigation being made to see whether the bladder is markedly contracted or not, and, if it is, treatment should be instituted to enlarge its capacity.

Continence of Urine. In some cases urine was voided at intervals, with no period of incontinence, immediately after the removal of the drainage tubes on the second or third day. As a rule, there has been an incontinence for several days, and in two instances a weakness in the sphincters was manifest, when the bladder became full, for several months. One of these is now well, and the other has no incontinence at night. No case of continuous incontinence has occurred among these 75 patients.

In only 1 case has anything like a stricture of the urethra developed after the operation. In this case the median

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portion of the prostate was removed, as shown in Fig. 9, and in so doing a portion of the floor of the prostatic urethra was accidentally excised. His physician reports that he found a stricture which was easily dilatable. I have not personally observed any case of stricture following the operation, and feel that the reported presence of only one case shows that instrumentation is entirely unnecessary as a routine procedure after the operation.

Preservation of Sexual Powers. I have endeavored to hear from every patient, so as to find out what effect the operation has had on his sexual puissance.

I will tabulate the replies of those who claim to have had normal sexual powers before the operation. Of these, 4 were under fifty years of age; 3 have erections and normal coitus; 1 has impregnated his wife; 1 has no erections; 6 between fifty and fifty-nine years, erections present, 5; coitus successful, 4; erections feeble, 1.

Fifteen between sixty and sixty-nine years, erections present, 10; coitus successful, 6; coitus not attempted, 4; erections not present, 5.

Six between seventy and seventy-nine years, erections present, 4; erections not present, 2.

Those cases in which the sexual powers were not present before operation need not be considered. A glance at the tabulation above shows that in a large proportion of the cases the erections and sexual puissance have been maintained after the operation. There are, however, a certain number of cases in which erections have not yet reappeared.[1]

What effect the preservation of the prostatic urethra, the verumontanum, and the ejaculatory ducts may have upon erections and ejaculations can be surmised by a comparison of these results with those of Albarran and of Murphy, who

[1] Two of these have lately (April, 1905) reported a complete restoration of sexual power.

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cut away these structures in their operations, and have reported an absence of erections or sexual puissance in nearly all cases after the operation.

Fistula. The perineal fistula has usually healed within two weeks. In a few instances it has closed within eight days. In only 2 cases that I know of has it persisted. In one of these the prostatic tissue removed has been found to be carcinoma.

Of the 4 cases of rectourethral fistula which I reported in my last paper, 3 have, I am happy to say, been cured by subsequent operation. After failing in several attempts at closure I have finally adopted the plan of supplying suprapubic drainage before closing the rectal and urethral openings separately. In this way the purulent urine is diverted from the sutured urethra, which is thus given a rest, and heals promptly. The suprapubic cystotomy adds nothing to the gravity of the operation, and has changed the results obtained from constant failures to constant successes.

These fistulæ occurred in men whose vitality was very poor (1 had diabetes); but I believe that at least 2 would not have occurred but for the placing of packing against the unprotected rectum.

In the last 35 cases, in which the levator ani muscles have been reapproximated by a catgut suture, and care has been taken to have no gauze press upon the rectum, there has been no case of rectal break-down.

In closing, I will say that after about 200 operations on account of hypertrophied prostate, among which were 85 Bottini operations with 6 deaths, 20 suprapubic prostatectomies with 3 deaths, I have come to the conclusion that for most cases perineal prostatectomy is the safest and surest and quickest method of curing the patient; that, whereas the Bottini method is the simplest and quickest for a certain limited number of cases, which can best be determined by the cystoscope, it is not so safe and nothing like so universally sure of relieving the obstruction as the perineal

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enucleation. The suprapubic route may possibly be necessary in certain large intravesical lobes.

I wish to state again my belief in the great advisability of a careful preliminary cystoscopic examination. In this way only have I been saved from several serious blunders.

The recognition of diverticula, incarcerated calculi, pedunculated prostatic outgrowths, and early carcinoma of the prostate cannot be made without the cystoscope, and an accurate mapping out of the prostatic enlargements is of great advantage in performing a perineal operation where careful preservation of important and non-obstructive structures is the aim of the operator.

DISCUSSION.

DR. JOHN B. MURPHY, of Chicago, Ill.—I wish first to comment on the first portion of the paper and to congratulate Dr. Young on the excellent showing he made with his cases. I wish to assure him of my personal obligation for his treatment of the subject in such a clear and practical manner. I feel pleased to hear him discuss the proposition of the preservation of puissance after prostatectomy. In that particular, the operation which I have followed has produced lamentable failures, and I took particular pains to draw the attention of the profession to that point in my first and subsequent articles. In every one of my patients I can safely say that full power of erection is absent, and in only a few is it partially retained. From a consideration of the physiology of erection (E. A. Schaffer's *Physiology*, vol. ii. p. 347), and as shown by Echard and Loven, erection is due to an active irritation of the vessels of the penis, especially of the medium and smaller-sized arteries. The factor is the contraction of the erector penis muscle, certain fibres of which pass over the dorsal vein of the penis and compress the vessel when they contract. Yet, these muscular fibres are not able by themselves to cause erection, since ligature of the veins coming from the penis is unable to produce it. During coitus the walls of the vasa deferentia and vesiculæ seminales enter the peristaltic contractions, which finally force the contents of these receptacles into the uterus. Erection can be obtained either by influence of the central nervous system (physical excitement) or by a reflex irritation of the genital centre, which is situated in the lumbar spinal cord. This power is retained after complete division of the cord higher up. It is well known that the testicles are not at all

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necessary to erection. This is known where castration is considered a special and necessary sacrifice. It is also true if castration does not take place before the fourth year. Besides the vascular explanation (compression of the dorsal vein by the erector penis) the author says that erection is due to active reflex hyperæmia produced by dilatation of tortuous arteries under the stimulus of sexual excitement. The phenomena of erection are, according to the author, similar to the hyperæmia of the skin produced by psychic impressions, popularly known as blushing. The frog has his erectal reflexes diminished by removal of the seminal vesicles (Jacobson). The seminal fluid is not only due to the testicle, but to Cowper's glands; prostate and vesiculæ seminales contribute the great bulk of the fluid. It would, therefore, seem to me that the preservation of the vesiculæ seminales, as supposed by Dr. Young's operation, would have little or no effect on the erection.

The next point is with reference to the avoidance of epididymitis. This has been a source of an immense amount of annoyance to me, as well as to the patients. Another thing, and one which is more annoying than the preceding one, is the occasional tendency to urethral fistula and the prolonged discharge of urine through the perineum in the act of urination. In an occasional case this does not happen, even by any method. All of my cases but one have eventually closed, some by minor operations.

As far as the mortality is concerned, it is practically the same. Of seventy-three cases, I charged one death to the operation, because the patient never regained consciousness. Prostatectomy was not performed as a matter of choice in this case, but as a matter of compulsion. The patient had an acute gangrenous cystitis, with an enormous stone, and in order to remove the stone, I took out the prostate first. He had calcareous vessels. I think the death in this case can be charged to the operation. The other deaths in my cases were due to the conditions unassociated with the operation.

I wish to emphasize the fact on which I previously laid so much stress, namely, the advisability and desirability of a timely operation. We must not catheterize these patients for years, and finally, when a septic process occurs, and its changes become intense in the bladder, then come to the surgeon for prostatectomy. They must come to operation early, just as soon as they reach catheter life. That is the time when we can assure rapidity of convalescence and the complete and absolute comfort which prostatectomy affords to these patients. Think of what it means to that class of men advanced in years and who have sufficient means to enjoy life; and it becomes an obligation on our part to give them the immediate advantage of a perineal prostatectomy. I say perineal. I am decidedly an advocate of the

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perineal route; but in cases of prostatic tumors that project into the bladder, I remove the prostate by the suprapubic route, and I believe it is the route for such cases. It involves no greater danger, but has a more prolonged and disagreeable convalescence.

DR. J. MCFADDEN GASTON, of Atlanta, Ga.—Like Dr. Murphy, I feel amply repaid for coming here and listening to this excellent paper of Dr. Young. I have two cases at the Presbyterian Hospital at the present time which were similar to those that have been described. One I believe is probably due to a diverticulum, and may be complicated with enlarged prostate. I had about come to the conclusion that the prostate was not the primary cause, but some anterior strictures; since hearing this paper I have given up the idea of atony of the bladder as the cause of his retention of urine. The patient has difficulty in passing urine, and has residual urine. He has to be catheterized every four hours, and that gives him comparative comfort. The old gentleman never had any sickness in his life until he reached the age of seventy years, and I think he must have the diverticula that have been described, because at times his bladder seems to be entirely empty, and by using a catheter in a certain direction and almost putting the hand over one of these diverticula, you can express ten or twelve more ounces of urine. There seems to be an enormous bladder.

The other case was one that has been operated upon by Dr. Emery and myself. Upon making a perineal operation, we found there was a stone in the bladder, and it was necessary to do a suprapubic operation to reach the stone, and, upon entering the bladder, we found there was a pocket in the prostate. There were four prostatic stones in addition to urinary calculi. These were difficult to remove. I believe with the technique Dr. Young has described we would not have had the difficulty we encountered in the removal of the prostatic stones, as by passing the finger through the perineal opening and having it meet with the finger of the other hand through the suprapubic opening, it was not possible to do anything scarcely, and it was necessary to incise the prostate to deliver the stones which were embedded, not simply situated in the prostate, but were covered with tissue and almost hidden. When I left Atlanta the man was doing fairly well. He was laboring under profound shock soon after the operation. I never saw a case in which there was any more profound shock than in this. We had to keep him under chloroform for a long time, but by the use of salt solution and strychnine he recovered; and I think drainage has been complete and sufficient. However, I wish to say again that with the technique described by Dr. Young, I believe the removal of the stones in the prostate in our case would have been much more complete and practically without shock, and I wish to thank the doctor for informing me about it.

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Dr. C. E. Caldwell, of Cincinnati, Ohio.—I would like to ask the essayist, as a matter of curiosity, whether in his experience he has ever come across a case where the posterior culde-sac of the perineum was so low that in removing the prostate gland there was a tear of the peritoneum? That occurred to me in the first case I operated upon. The case was not very difficult, because the prostate was not very large. It was obstructed. The patient could not be relieved any longer by catheterism, and there had been an inflammatory condition of the prostate gland. The capsule was adherent; I did not have much difficulty in removing it. The operation was rapidly completed, and I was congratulating myself on the ease with which it had been done, when I noticed a loop of intestine back of the site of the prostate gland, which was disconcerting at least. However, I pushed it back, put in some gauze, and there was absolutely no untoward consequence. The man got well. He now voids his urine freely, and has fair continence of urine.

The other case was a much easier one, in a man aged seventy-five years. In this case the prostate was removed readily; it came out like two halves of an apple. The gland was very large, but smooth, and, after incising the capsule, it was removed quickly. The only delay incident to the operation was due to stopping hemorrhage. One would not have minded the hemorrhage so much were it not for the extreme age of the patient; consequently it took longer than usual to control it entirely. He died at the end of about seven days, from hypostatic pneumonia. His condition up to the day before his death had been good, temperature normal, and no pain or discomfort in the perineum.

Dr. Charles H. Mayo, of Rochester, Minn.—I think we owe a debt of gratitude to Dr. Young for this very excellent and most instructive paper. I rise to speak of a case which occurred in the practice of my brother (Dr. William J. Mayo) six weeks ago. A young woman, aged thirty years, presented herself and seemed to have some abdominal tumor or cyst, probably ovarian in character, as it filled the pelvis up above the umbilicus. Urine was passed in the office without any difficulty and examined. She was placed upon the table, and an incision disclosed a cystic tumor; it was unusually adherent and hard to get at. It was thought best to collapse it, and so a trocar was used and a gallon and a half of fluid removed, which had the odor and characteristics of urine, and then, by freely incising the collapsed tumor, it was found that there was an enlarged urachus. It was a diverticulum communicating with the bladder, about two inches across, yet no urinary symptoms nor urinary history. The patient was passing the ordinary amount of urine. There was no history to show that there was such a condition. The collapsed sac was removed and a plastic operation made,

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closing the bladder, and beneath this and filling the pelvis was the ovarian tumor. The case was very puzzling.

I have been very much pleased with the exposition of Dr. Young's work upon the prostate, and, as we all know the character of these patients, and the results which he has so carefully explained to us, I do not think it is possible for anyone to show a better series of results or a lower mortality in this class of individuals which come to us for such operations.

Dr. Young (closing).—In regard to Dr. Murphy's question as to closure and drainage, I may say that I introduce two drainage tubes into the bladder through the urethral opening. A single clot may block one drainage tube, but if you put two catheters in together and connect one with a fountain syringe, you can keep up continuous irrigation and wash away all clots. It also supplies a certain amount of vesical pressure, which I think is important not to remove at once. The continuous irrigation is kept up for from twelve to twenty-four hours, at the end of which time the tubes are removed. Two gauze packs are put in at operation, one in each lateral cavity, and they are removed generally on the second or third day. By early removal of the gauze and tubes I have reduced the time of convalescence, and have been able to send some patients home practically well in two weeks. The following case is an example: A man, aged sixty-five years, who had nausea and vomiting and was quite uræmic, was catheterized for about four or five days, each time 800 c.c. residual urine being obtained. After four days it was determined to do an operation, which was performed. Continuous irrigation was kept up with double drainage tube for twenty-four hours. The tubes were taken out on the second day; the gauze was removed on the third day. The patient was out of bed on the fourth day, and began to urinate naturally on the fifth day. On the eighth day all urine ceased coming through perineum, and on the fourteenth day he left for home. And this is not a very unusual case. In two cases the perineal fistula closed on the sixth day, but, as a rule, it takes twelve days, sometimes two weeks or longer.

As regards Dr. Caldwell's question with reference to tearing the peritoneum, I will say that I have never found that as a complication in ordinary prostatectomies, but I have in operations upon tuberculosis of the prostate and seminal vesicles.

The case cited by Dr. Gaston is certainly interesting, and from what he has said it would seem to be one of vesical diverticula.

Dr. Mayo's case of large diverticulum is very interesting. I would like to ask him whether the diverticulum was excised or not.

Dr. Mayo.—We sutured it.

Dr. Young.—That is certainly an interesting case. I appreciate very much the kind remarks of both Drs. Mayo and Murphy.

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WHEN SHALL WE RESECT IN TUBERCULOUS JOINT DISEASE?

By C. E. Caldwell, M.D.,
Cincinnati, Ohio.

Our judgment as to the advisability of resorting to resection in a given case of tuberculous joint disease will be influenced by many considerations.

1. The joint itself, its anatomy and general characteristics.
2. The part it bears as a weight-bearer.
3. The degree of disability incurred by its involvement.
4. The relation of the joint to surrounding soft parts, its accessibility, and the readiness with which it admits of drainage.
5. The degree of severity and progress of the disease as influenced by the function of the joint.
6. The results to be expected from conservative treatment.
7. The results to be expected from excision.
8. General considerations.

As to the joint under consideration, somewhat will depend on whether it is a single, large, isolated joint, such as the knee for instance, or whether it is a smaller joint, such as a carpal or tarsal, and consequently in immediate contiguity with other joints. A single tuberculous focus in the epiphysis of a long bone, which is susceptible of complete immobilization, stands a much better chance to undergo reparative change than would such a focus in the spongy bones of the wrist, in the close proximity of synovial and ligamentous structures which favor dissemination and persistence of the

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disease. Again, aside from the predisposing influences of trauma, and of the pressure exerted by weight-bearing on two apposed articular surfaces, I am inclined to believe—and I frankly acknowledge that this is only a theory on my part—I am, I say, inclined to believe that the closeness of approximation of certain joint surfaces in an attitude of rest may have some influence, if not in the production, yet in the persistence and extension of disease when once present. For example, the elbow-joint is much more frequently the site of tuberculous disease than the shoulder; the hip-joint is more frequently diseased than the knee. If it be objected that the elbow is more exposed by reason of its superficial position to trauma and to atmospheric changes than the shoulder, contrariwise it may be said that the knee for the same reason is more liable than the hip, where the relative frequency of attack is reversed. But the condyle of the humerus is held in a close embrace by the great sigmoid cavity of the ulna, and the head of the femur even in an attitude of rest is closely embraced in the almost air-tight cavity of the acetabulum; so that the element of friction is, so to speak, constant. On the other hand, the arm by its dependent weight distracts the head of the humerus from the shallow scaphoid fossa of the scapula, and in the attitude of rest, as in sitting, the weight-bearing surfaces of the femoral and tibial ends are scarcely in contact. To this close approximation of surfaces primarily affected in these joints I am inclined to attribute the frequent persistence of disease in the elbow-joint, even when completely immobilized, and in the hip, where traction is not carried to the point of distraction of the diseased surfaces. Only when direct traction in the latter instance is supplemented by lateral traction is it at all likely that distraction of these surfaces occurs. In the case of the elbow I know of no method by which distraction of the surfaces of the sigmoid cavity of the ulna and the inner condyle of the humerus may be effected.

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An isolated focus of tuberculous disease in the epiphysis of a long bone may, and often does, exist for quite a time without giving rise to marked pain or disability, especially if the focus be sufficiently removed from the articular surface to obviate the distress of direct pressure. Even in disease of the knee-joint it sometimes happens that not until there is extensive involvement of the soft parts, with gelatinous infiltration of the capsule and periarticular structures, do we get sufficiently marked symptoms for the patient to seek medical advice. Pain is often a marked feature of the disease only with the occurrence of erosion of cartilage. Taking it for granted that the vast majority of cases of joint tuberculosis have primary epiphyseal bone lesions, there is but little doubt that, could we see these cases before the stage of fibrillation of cartilage, a condition which precedes erosion for some time, conservative treatment might be sufficient to effect a cure.

The part which a joint plays as a weight-bearer, or the degree of pressure to which it may be subjected in manual occupations, undoubtedly greatly influences the development of the disease. The absence of both factors, weight-bearing and pressure, accounts for the comparative immunity of the shoulder-joint.

Distraction of apposing surfaces in tuberculous disease is a consummation devoutly to be wished, not only to avoid pressure, but to prevent extension of disease by contiguity. Distraction is manifestly more readily effected in certain joints than in others. In the bones of the carpus and tarsus, in the elbow and the hip, separation of diseased bones is a matter of impossibility, or attended with great difficulty. In disease of joints of the upper extremity, immobility and protection, both important factors in establishing a cure, may be effected with but little difficulty, and the disability is such only as is incurred by the disuse of a limb. The patient may get about freely and avail himself of the opportunities for fresh air and exercise, which in

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themselves erect such efficient barriers against the progress of tuberculous disease. In spite of everything, however, the disease often progresses, and the reason is found in the contact and pressure of the diseased surfaces. Skiagrams taken at frequent intervals are valuable aids in estimating the progress or arrest of the disease.

In disease of joints of the lower extremities the disability of course is great, and, when the patient comes under treatment, should be enforcedly complete. Dr. Calot,[1] of Berck-sur-mer, is just out in a treatise on the treatment of hip disease in which he insists on recumbency and immobilization over a period of one to two years as a *sine qua non* of success. Calot is very positive in his assurances of being able to cure most of his cases without the supervention of abscesses by his method of treatment, which consists in absolute recumbency, fixation in plaster of Paris, plenty of fresh air, and forced alimentation. He insists on the necessity of having an orthopedic hospital in the country and, if possible, by the sea-shore, both of which advantages—and they are undoubted—Berck sur mer enjoys. Dr. Calot, however, does not regard the presence of abscess as an unmixed evil, but makes the rather unique assertion that he obtains cures earlier in his abscess cases than in those in which abscesses are absent. He treats his abscesses by repeated aspiration, never by open incision, and injects a mixture consisting of equal parts of camphorated naphthol, 10 per cent. iodoform ether, and 5 per cent. oil of creosote. Of this mixture he uses one-half cubic centimetre for each year of age up to twenty. Dr. Calot seems to have most unbounded faith in this treatment, although Gibney,[2] in a recent article, admits that injections into abscess cavities have been given up at the Hospital for Ruptured and Crippled, and that the opening and cleaning out of abscess cavities and subsequent suturing is the method at present in vogue.

The relation of the joint to surrounding soft parts has some bearing not only on the early recognition of the disease,

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but upon the certainty with which we may observe and control its advance. It is self-evident that disease of the knee-joint not only will be more readily recognized by objective signs than disease of the hip, by reason of its scanty covering of soft parts, but that the progress of the disease may, by inspection and palpation, be more accurately estimated.

Pain, posture, muscle tension, and temperature are all valuable criterions as to the progress or arrest of disease, but there is a great advantage in the corroboration of the senses of sight and touch. Again, in abscess and sinus formation it makes a great difference whether the sinus finds a circuitous path through thickly enveloping soft parts or pursues a direct course through a comparatively thin layer of fibrous expansions. The degree of severity and the progress or persistence of the disease will often depend on the function of the joint and the extent to which, in the necessities of the individual, it must be used. When people are dependent for their very livelihood upon their ability to get about, or where, as in the children of the poor, the parents are not given to listening with tender solicitude to the complaints of their children, much irretrievable damage may be done by persistence in the use of a limb when every indication for rest is present. The failure on the part of the medical attendant, who often renders a reluctant service where no pay is expected, to recognize the condition or to emphasize the urgent necessity for care and surgical attention, is often responsible for further neglect. So that these cases often come to us in a deplorable condition, a condition in which conservative treatment can be of little avail either in arresting the disease or preventing deformity. The results to be expected from conservative treatment may be divided into three classes—ideal, satisfactory and unsatisfactory. An ideal result is where, after a reasonably long period of treatment, a cure is obtained with no limitation, or but slight limitation of movement, and no deformity. These results

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must necessarily be very rare; so rare, indeed, that a question of correct diagnosis may be reasonably raised. Yet there are undoubtedly cases, and these cases are among the better classes, where competent medical advice is sought on the first manifestation of trouble, and in which the characteristic symptom-complex of tuberculosis is recognized so promptly and treatment instituted so early that the tuberculous focus is walled off before it has a chance to do permanent mischief to the joint. These can hardly be classed as joint cases, but are more properly speaking cases of tuberculous epiphysitis which would in a short time, if neglected, have become tuberculous arthritis.

The frequent use of the skiagram as a diagnostic accessory will, undoubtedly, in the future, more accurately define the exact pathology and limitation of these early stages of infection. Where a skiagram shows small foci of tuberculous disease in accessible situations external to the joint capsule, as, for example, in the head of the tibia, or in the greater trochanter of the femur, early incision and curettage may eradicate the mischief at once and for all time.

Under satisfactory results may be classed those which, after a reasonable period of treatment, are cured with a stiff joint, or one in which a slight range of movement is possible, without shortening or malposition, and in which, if there has been abscess or sinus formation, the sinuses have healed. Such results are obtained in the majority of cases seen sufficiently early or before marked osseous defects are present.

Under unsatisfactory results may be classed those which, after a reasonable period of treatment, either show no tendency to get well or may be said to have recovered with sinuses still weeping, with a tendency to fatigue on exertion, with more than an average amount of shortening, and with deformity to a greater or less degree. The absence of any active symptoms of disease, as pain, increased temperature, or muscular rigidity, places these in the category of cured cases, but cured with unsatisfactory results.

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In the face of so much that is uncertain and indeterminable in many of these cases, it is hard to determine where conservative treatment should end and operative treatment begin. Obviously, if operative treatment were successful in removing all foci of disease and could restore our patients to a condition of usefulness, with less liability to relapse, in a much shorter period of time than can be expected from conservative treatment, we should resort to it early—the earlier the better. The fact that resection means a stiff joint should be no argument against it, for a stiff joint is almost inevitable after conservative treatment, except in such cases as are seen very early. In speaking of a stiff joint as the result of resection, I have in mind especially the knee, which is the joint in which we are to look for the most satisfactory results from resection. The results from the resection of the hip are of necessity much less satisfactory when complete, as with ablation of the neck and head of the femur, we leave no *point d'appui* for the femur, and there must necessarily be a greater or less amount of give to it under the weight of the body. Indeed, it is questionable whether resection of the hip should be undertaken except in cases of rapidly destructive epiphysitis of the femur, with possible or present involvement of the acetabulum, cases of abscess of an acute and painful nature, associated with high temperature, and cases of chronic abscess which fail to get well after repeated aseptically conducted aspirations, as when there are obstacles to the proper draining of the joint, such as acetabular complications, the presence of a detached necrotic head, or gelatinous tuberculous debris. The great objection to the operation in any case is, however, the difficulty of removing all affected structures and the unsatisfactory prosthetic results. Calot, in the work above quoted, says: "Resection of the hip in hip disease is a bad operation; it mutilates the patient and does not cure his tuberculosis." "But," he goes on to say, "one may be obliged, at a given moment in a case of hip disease with infected fistulæ, to open the joint widely,

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and even to remove the head of the femur in order to insure the free drainage of pus." He believes that free incisions about the joint will often prove inefficient to drain a hip abscess, but that when a diseased femoral head stands in the way of drainage this should be removed, and as there may be at the same time intrapelvic collections of pus, this will afford an opportunity to drain through the perforation in the acetabulum. Dr. Calot recommends an incision in the aponeurotic interval between the *tensor fasciæ latæ* and the *gluteus medius*. This incision I believe to be of advantage in that it enables one to completely expose the posterior aspect of the capsule before opening it, and one may arrive at a very fair estimate of the condition within the joint before opening it. Again, it gives command of the trochanter, which, if soft, may be removed at the same time with great ease.

Skiagrams of the hip are with greater experience becoming more and more reliable, and now offer us very definite information as to the condition of the femoral head and neck. Where the radiograph shows marked osseous change, and abscess is present, nothing is gained by waiting; immediate resection will be a great time saver. In tuberculosis of the knee we are confronted with an entirely different problem. There is but little use in wasting time with a knee-joint in which marked osseous changes are already present, and which, in spite of conservative treatment over a period, we will say, of six months, has shown no improvement. Resection of the knee in cases which have passed the period of adolescence has much to recommend it, and but little can be said against it. The joint is accessible, the diseased structures are susceptible of complete removal, and the results as far as function is concerned are as good if not better than we can expect by conservative treatment. In these cases too long delay often means amputation. Resection, practised as soon as it is evident that conservative treatment is not accomplishing much good, is easy of execution, prompt

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in results, and satisfactory as far as the function of the limb is concerned. In adults who are dependent upon their daily exertions for a living, it is advisable, if not peremptory. Koenig[3] in a recent article supports this opinion. Dr. Blauel,[4] of Prof. Bruns' clinic, in a recent very exhaustive article, which I reviewed in the Cincinnati *Lancet-Clinic*[5] for September and October of this year, has presented the subject of knee-joint resection in a light which, if not altogether convincing, yet offers many strong arguments, supported by an array of statistics, in favor of earlier resort to resection in knee-joint tuberculosis. The striking feature of the article is the advocating of knee-joint resection in children. In 267 resections done since 1889 for knee tuberculosis, 70 were under ten years of age, 99 between ten and twenty, 63 between twenty and thirty, 26 between thirty and forty, 9 between forty and fifty. To quote from this review: "The chief contraindication to resection, according to the author, seems to be age beyond fifty years. In 400 cases not once was this age limit overstepped." I would say in this connection that I have resected in 2 cases over fifty years of age and with perfect results. "On the other hand, the author does not regard extreme youth as a contraindication, providing that thin slices of bone and cartilage are removed. Of 400 resections, 186 were done in children. The author expresses himself decidedly against arthrectomy as being a temporizing measure, uncertain in its results, and offering not so good chances of a useful limb as a complete resection." As to resections in childhood and adolescence, he says: "Of course, the younger the patient the greater the liability to impairment of growth through injury to the epiphyseal extremities, but this interference with growth is more apparent than real, inasmuch as the artificial shortening by resection must be subtracted from the entire shortening to arrive at an exact estimate of the amount of shortening due to interference with growth." Dr. Blauel recalls a number of cases where very extensive shortening

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from interference with growth occurred where resection had not been done. I will only say without going into details that Dr. Blauel succeeds in making out a very good case in his arguments for excision even in children under the age of thirteen. He advocates in these cases the removal of very thin slices of bone. As to resection in elbow cases we are again confronted by the fact that results are at the best far from what we might desire. A firm, bony ankylosis is not always obtainable and not infrequently we get a flail joint. A flail joint is, however, not one to be despised, as I remember two cases in my own practice where the patients expressed themselves well satisfied with such a joint, and it certainly was a very great improvement over the condition before operation. Again, at the risk of tiresome reiteration, I wish to emphasize the importance of a satisfactory skiagram as a preliminary in these cases to operative interference. In the smaller joints, such as the wrist and carpal joints, excision must depend on individual judgment. Ankle-joint and tarsal excisions are, as a rule, very unsatisfactory. The deficiency in weight-bearing capacity renders the results far from gratifying, and amputation is, as far as my observation goes, too frequent a sequel to these operations. Under general considerations, I would not only include all the foregoing, but those which pertain to the social status of the individual, his surroundings, hygienic or the reverse, and the personal equation of constitutional resistance.

This paper has been written more with the view of eliciting discussion than from the belief that I had anything noteworthy to contribute.

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[3] Abwartende Behandlung oder Operation. Koenig, Berlin. klin. Wochenschrift, 1903, vol. ix. p. 20.

[4] Dr. C. Blauel. Beiträge zur klinischen Chirurgie, April, 1904.

[5] Review of Dr. C. Blauel's article. Cincinnati Lancet-Clinic, September 24 and October 1, 1904.

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DISCUSSION.

DR. E. DENEGRE MARTIN, of New Orleans, La.—I am very glad indeed to have heard a paper on a subject in which I am very much interested. My views have been expressed almost exactly by the essayist. I believe that unless we get these cases in the early stages and the history is such that we can make a diagnosis, we can expect very little from the rest treatment. As a rule, the hospital cases are forced into the institution by pain and discomfort, and I usually find it absolutely necessary to operate about the time they first come in. I have tried, and tried patiently and persistently, treatment by aspiration and the injection of iodoform emulsion, and I believe in almost every instance I lost valuable time. It appears to me that in the majority of cases the disease begins in the epiphyses, and the invasion extends to the capsule. In a case I operated upon a few days ago, the joint itself seemed to be in excellent condition, although the entire capsule was involved. Just as soon as this condition exists, nothing short of an operation will do good.

My experience has been the same as that of the essayist in regard to the joints. Tuberculosis of the tarsus, if at all extensive, almost invariably demands amputation of the foot. The results have been most unsatisfactory in tuberculosis of the knee-joint. I believe that when we resort to resection, we can get the very best results. We are sure to get ankylosis if the disease has involved an extensive area, and the sooner we operate the less we have to sacrifice in the length of the limb. In a resection, I make it a rule to rivet the bones together, with slight flexion forward. Even an angle of about ten degrees is not too much, as when the patient is sitting down it does not look bad, and does not shorten the limb very much. They seem to get along better and they raise the toe with more satisfaction. Such has been my observation.

In regard to the elbow-joint, I believe in these cases we can get excellent function if we see the patients early enough. I have a case now in which I resected four inches with the condyles, the entire joint being involved, as well as the olecranon and the head of the radius. This woman, notwithstanding this fact, has a serviceable arm; she can throw it in any position, comb her hair, and use it for nearly everything. She can play on the piano pretty well. In a recent case I removed only the epiphysis of the joint; the entire capsule was involved. I left a part of the olecranon, as suggested by Koenig, leaving also the attachment of the triceps. I am very anxious to see the result in this case. I put in a drain to prevent bony ankylosis, hoping for fibrous union and a fairly good result.

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In these cases, when once the soft tissues have become involved, my personal experience has been that surgical interference is far better than treatment by injections, although we see reports of cases in which the latter treatment is said to have been followed by gratifying results.

Dr. Samuel E. Milliken, of Dallas, Texas.—I have been very much instructed by Dr. Caldwell's paper, and I shall be glad to have him state his views further in closing the discussion with reference to tuberculosis of the knee-joint. When it comes to excision of this joint, it is a matter that should be weighed very carefully. The knee-joint is certainly the most favorable joint for excision when we expect ankylosis. It is just as Dr. Martin has said, the ankle-joint is certainly very prone to give us a frail joint. We have observed such cases. In the elbow-joint, on the contrary, I have been able to get a very useful joint in many instances. I reported one case, after eight years of ankylosis, in the *New York Medical Journal* in 1896, in which I obtained perfect restoration of function, and I think in the other cases have had equally good results.

When it comes to excision of the hip-joint, it is a most serious matter, and in the conservative treatment of these tuberculous joint lesions, especially of the hip, I think early diagnosis is of the greatest importance, together with prompt immobilization, rest, and protection. I do not believe there is any appliance or apparatus yet devised which gives us any hope of so-called extension except recumbency.

One word in reference to the treatment of so-called tuberculous abscess by means of various injections. I have tried this method and have seen it tried, and, according to my observation, which has not been very extensive in recent years, because I have moved to the country, where we have very little joint tuberculosis, all of our cases of tuberculosis being imported from the Southwest very largely, it has not been satisfactory. I have injected the so-called cold abscess of Pott, subsequently explored, and found the injection products of oil, iodoform emulsion, had not been changed. Any operative interference in cases of abscesses of the hip-joint certainly should be carried out with the strictest antiseptic precautions. Aspiration has not always been very satisfactory in my hands. I believe that unless excision is complete, partial arthrectomies are possibly the most harmful of all procedures. I think they are contributory to absorption of tuberculosis and other complications.

Dr. Caldwell (closing).—I have very little to say, with the exception of the objection I make to this bending of the knee a little, which throws a good deal of the pull on the hamstrings and tendon. I think we should pay particular attention to flexion deformities and possibly to genu valgum, and where we flex the knee we get a stronger pull.

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OBLITERATION OF STOMACH BY CAUSTIC.

By S. J. Mixter, M.D.,
Boston, Mass.

Every surgeon is familiar with cicatricial stricture of the œsophagus and pylorus as the result of the ingestion of caustic liquids, but a destruction of a large part or the whole of the stomach from such a cause must be rare, as most patients die as the immediate result of so serious an accident. The following three cases occurred in the Massachusetts General Hospital, the first two being under my care, the third in the service of one of my colleagues:

Case I.—John B., aged thirty-six years, when drunk swallowed some nitric acid of unknown strength. Remembers that it burned his mouth, but nothing more. Was brought to the hospital collapsed and almost unconscious. Magnesia solution given and stomach washed out. Washings showed presence of nitric acid. Mouth and fauces were burned.

The patient recovered and left the hospital in six days, returning in about five weeks much emaciated, able to swallow only small quantities of food, which were soon vomited. He said that he was sure no food passed through the stomach. He was nourished by nutritive enemata for a few days and prepared for operation. On opening the abdomen the stomach was found to consist of a rope-like mass extending from the pylorus to a bit of normal stomach tissue near the cardiac opening, not larger than an orange. The contracted stomach was incised and curetted for examination, the scraping showing only granulation tissue. This opening

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was sewed up and a gastrojejunostomy was made by means of the McGraw ligature. The operation was difficult, as the remaining portion of the stomach was so small and inaccessible.

The patient made a good recovery, gaining sixty pounds in a few weeks, and was working at his trade when last seen.

CASE II.—Daniel D., aged thirty-eight years, while drunk swallowed some soldering solution (probably acid chloride of zinc). Vomited and soon became unconscious. Was fed for a week by enemata, and swallowed only small amounts of liquids for five weeks, when he entered the hospital. Had lost thirty pounds.

On examination it was found that only a few drops of water could be swallowed, the smallest œsophageal bougie could not be passed, and a gastrostomy was decided upon.

On opening the abdomen it was found that the stomach was represented by a long, firm mass, adherent to surrounding parts, no sign of any stomach cavity proper being left. The duodenum being normal, a duodenostomy was made. Peptonized food was introduced through the tube the next day and the patient made a rapid recovery, gaining weight and strength, leaving the hospital in a month.

In this case there was no œsophagus or stomach left, and the patient, being very stupid and obstinate, would not or could not take proper care of himself. When seen some months later he was in fairly good condition, his only complaint being that he could not swallow.

CASE III.—Thomas R., aged fifty-six years, patient of one of my colleagues at the hospital, who kindly permits me to report the case.

The patient had been a hard drinker, taking anything that came in a bottle, even amyl alcohol at times. Does not know just what caused the trouble, but when he entered the hospital he could not swallow.

An attempt was made to pass a flexible œsophageal bougie, the instrument apparently passing easily into the

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stomach. He soon developed abdominal symptoms and died in a few days.

Autopsy showed death to be due to peritonitis following perforation of the œsophagus, which was almost obliterated at the lower end. The stomach resembled exactly that in the previous case, a hard mass about six inches long and an inch to an inch and a half in diameter. On section it was found that the cavity was practically obliterated, and microscopic examination showed that the entire muscular and mucous coats were replaced by cicatricial tissue. Below the pylorus the tissues were normal.

In addition to these three cases I am indebted to Drs. E. P. Joslin and D. F. Jones for the report of a case observed and operated upon by them in which a stomach, very similar in appearance, was found. This was in a young woman with a history of syphilis, and though nothing was done to the stomach at the time of the exploratory laparotomy, careful feeding and antisyphilitic treatment greatly relieved her symptoms.

DISCUSSION.

Dr. Maurice H. Richardson, of Boston, Mass.—I have seen one case in which the œsophagus was totally obliterated. The patient was too young to talk, and we could not make out the cause. It was supposed, however, that the patient had swallowed caustic. We could not get the smallest bougie to pass through the œsophagus.

I have seen a case of partial obliteration of the stomach, which required a plastic operation on the pylorus; but have never seen anything like the extraordinary and interesting cases which Dr. Mixter has reported.

Dr. J. M. T. Finney, of Baltimore, Md.—I have had no experience with such cases as Dr. Mixter has reported, although I have operated on cases that were diagnosticated by physicians as cirrhosis of the stomach. In one of these cases, which was referred to me by Dr. Osler, the cavity of the stomach was not larger than the cavity of an ordinary hen's egg. It would hold, perhaps, an ounce and a half, ar at most two ounces. The walls were extremely thick, and it was difficult to determine what was

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the best thing to do. I finally did a gastroenterostomy; but the patient's condition was so bad that he did not recover.

I have met with one case of congenital absence of the œsophagus, and another one of congenital absence of the pylorus. In the first the stomach was closed at one end, and in the second at the other. I did a gastrostomy on a three-day-old baby, but the baby only lived three days. In the other case a gastrojejunostomy was performed by the house officer at the Johns Hopkins Hospital, and, unfortunately, that patient succumbed. Both were in very debilitated, very weak infants.

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VAGINAL CÆSAREAN SECTION; REPORT OF A CASE.

By C. Jeff Miller, M.D.,
New Orleans.

Nearly ten years have elapsed since the operation of vaginal Cæsarean section was first suggested by Acconci, and later described and recommended by Dührssen as a safe and rapid method of emptying the uterus in eclampsia. Notwithstanding Dührssen's enthusiastic arguments and several contributions, it has not met with general favor, for, up to the present time, hardly more than one hundred operations have been recorded.

It is interesting, however, to note the more frequent reports of cases during the past two years and the gradually widening field of its application. That it has gained favor as a method of accouchement forcé during the past five years is distinctly to its credit, for during this same period more attention has been paid to the perfection of manual dilatation, and the invention of numerous metal dilators than ever before. Bossi, Frommer, Kaiser, De Seigneux, and others, have all produced powerful instruments, ideal in theory, but furnishing varying reports from a practical standpoint, and the vaginal Cæsarean section has had to share attention and heated discussion with each method. Those who favor the operation recognize that it has a limited field of usefulness, that it was never proposed as a routine procedure, but will find its particular application in a class of cases not amenable to either manual dilatation, metal dilators, or abdominal Cæsarean section.

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J. Munro Kerr,[1] who has reported 3 cases in which the method was successfully used, states as the first and greatest argument in favor of the operation that sometimes it is the only method by which rapid emptying of the uterus is possible, as, for example, a case in which the cervix would not stretch, and another reported by Eherendorfer (a case of uncontrollable vomiting), in which the cervix could not be dilated.

Such cases are extremely rare; nevertheless, obstetricians of extensive experience are liable to meet with them occasionally, and if they refuse to adopt this method they have no alternative but to pack the cervix and wait, and in some cases, if they do, they will lose patients.

One year after Dührssen's initial paper in which he suggested the procedure in eclampsia, he advised it in abnormal growths of the cervix and lower segment of the uterus (carcinoma, myoma, rigidity, stenosis of the cervix, and partial pouch-like distention of the lower uterine portion); dangerous conditions of the mother, which may be removed or relieved by prompt emptying of the uterus, affections of heart, lungs, and kidneys, and conditions of the mother when death is imminent and can be foreseen.

This classification is really broad enough to cover the entire field for which accouchement forcé is ever indicated, and will be promptly challenged by those who have, by experience, found other measures satisfactory in each of these classes.

It is unfortunate that these two methods of treatment should have been pitted against each other to the extent that Bossi and Dührssen have carried the matter. In the end such contention only serves to confuse the obstetrician of moderate experience, without distinctly pointing out the special merits and limitations of either method.

That the operation has come to stay and will prove a

[1] Journal of Obstetrics and Gynecology of the British Empire.

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valuable addition to our obstetrical resources there is no doubt.

It will be the operation of choice in certain cases of rigid cervix, especially when complicated by extensive scars from previous labors; when it is necessary to empty the uterus promptly in instances of accidental hemorrhage, with the cervix still closed, and in some cases at present subjected to abdominal hysterectomy.

This, as you will see, limits the field to cases fortunately rare, but it makes it no less an operation of choice and advantage at a moment when time is an important factor. The chief objection to the operation is that it is not suitable to ordinary obstetrical practice. It requires a degree of surgical knowledge not usually possessed by the general practitioner, and should not be performed except under the strictest precautions of cleanliness. These are serious objections, yet it is safe to say that the consequences of performing the operation under the usual difficulties of obstetrical work are not more serious than dragging the head through a partially dilated os with forceps, a frequent practice which adds daily to the list of puerperal catastrophies.

So far its greatest field has been in advanced carcinoma of the cervix complicating pregnancy. The general concensus of opinion seems to be that in such cases it affords the best method of avoiding the severe laceration and hemorrhage, and is a step toward the completion of hysterectomy, which should be performed after the uterus is emptied.

J. Whitridge Williams[1] believes that the operation has a limited field of usefulness and should be reserved for such cases as just mentioned.

Webster believes that in advanced carcinoma of the cervix labor should not be allowed to take place, that vaginal Cæsarean section should be done if possible and followed

[1] Text-book.

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by hysterectomy. He places it before the Porro-Cæsarean operation when feasible.

Puerperal eclampsia has furnished the indication for the operation in the next largest series of cases.

Dr. M. Stamm,[1] whose paper was the first to appear in American literature, has successfully performed it in 2 cases, and has also given us an extensive review of the German literature up to September, 1903. The Germans were the first to recognize its merits, among whom is Bümm, who, it is interesting to note, has performed the operation thirteen times and expresses himself very strongly in its favor. Five of these were for eclampsia, and only one mother died (in coma).

In a personal letter recently received from Dr. M. Stamm, he refers to Hammerschlag's article (*Zentralblatt für Gynäkologie*), who has collected 21 cases of eclampsia in which the operation was resorted to. Of the 21, 9 died. In 10, the convulsion ceased immediately; 3 cases had from one to eleven convulsions after delivery had been completed.

Bacon and Carstens have also recently reported successful cases. In comparison with abdominal Cæsarean section in eclampsia the vaginal route has many advantages. First as to the mortality. In 34 cases of abdominal Cæsarean section on record, 55 per cent. died, 4 of which were from sepsis.

Few will dissent from Spencer's statement[2] that abdominal Cæsarean section is and always has been an absolutely unjustifiable operation for eclampsia, because the patient can be delivered by rapid dilatation per vaginam in less time and with less danger. If it is ever proposed it should not be with the idea of benefiting the child, except at full term, for Dührssen in an analysis of fetal deaths, in reference to the period of pregnancy, states that in the seventh month, and earlier, the mortality is 100 per cent., 93 per cent. in the

[1] American Journal of Obstetrics, 1903.

[2] Journal of Obstetrics and Gynecology of the British Empire.

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eighth, 54 per cent. in the ninth, and 37.8 per cent. at full term.

Such results point to the advantage of the vaginal operation in severe eclampsia after the fifth month and until the seventh, when the cervix is not easily dilated by ordinary methods.

It is but just to mention, however, that the chief advantage urged, that of the rapidity with which the uterus can be emptied, may only occasionally be of importance. Kerr alludes to this, and states that four or five minutes only are required. In most cases, however, he believes the difference of emptying the uterus in five minutes and in thirty minutes, as with Bossi's dilators, is immaterial.

PLACENTA PRÆVIA. A few cases of placenta prævia treated by vaginal Cæsarean section have been reported. It is safe to predict, however, that the operation will never be adopted by practical obstetricians, for the same objections hold good here that have been raised to the vaginal route, viz., that the other means of treatment are so satisfactory (so far as the mother is concerned), that it would be urging a method of questionable utility in behalf of the child at the expense of the mother. Moreover, I believe it is generally agreed that the fetal mortality is not susceptible of material reduction, for the reason that the pregnancy is generally terminated before term, when the chances of extra-uterine life are relatively unfavorable. Of the two operations, vaginal and abdominal Cæsarean section, everything being equal, the former would give the child equal chances, and the mother some advantage, both from the standpoint of primary results and secondary morbidity.

ACCIDENTAL HEMORRHAGE. While there is still a strong question of doubt as to the merits of the operation in eclampsia and placenta prævia, little can be urged against it in the severe cases of accidental hemorrhage, when the cervix is closed and rigid, and the woman is becoming exhausted from the loss of blood.

Kerr, who could not predict the future of the operation

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in other affections, believes that its great place will be in accidental hemorrhage in which so many recommend hysterectomy.

There is no question but that it possesses distinct advantages over abdominal hysterectomy, aside from the most important point that it is not a mutilating operation. As a working rule it may be urged as the safest of the two operations when it becomes necessary to treat the case away from an equipped infirmary.

Since the case I desire to record was one of this type, the history is introduced here.

Mrs. J. H., aged twenty-eight years, had borne one child eleven years previous to this confinement. The delivery was tedious and accomplished with forceps. The perineum and cervix were severely torn and were never repaired. Her recovery was slow. For many months she had pelvic distress after physical effort, in fact suffered all the inconveniences of relaxed pelvic outlet, together with sensitive cicatricial tissue in the vaginal vault as resulting from a laceration into the base of the broad ligament. Ten years later she conceived, and up to the beginning of the sixth month her history was that of a normal pregnancy. Then symptoms of renal insufficiency developed. The lower extremities became swollen, her face bloated, and she experienced severe headaches. Her urine contained considerable albumin. Rigid diet, saline purges, and rest cleared up the conditions quite satisfactorily. Toward the middle of the seventh month the anasarca reappeared and she was again put to bed and dieted, but after four days she returned to her household duties. About 2 o'clock in the morning after an active day, sudden, severe pain developed over the front of the uterus and to the right flank. Later she fainted, but revived and summoned a neighboring midwife, and stated to her that the character of the pain was such as to indicate that she was in labor. A slight discharge of dark blood was appearing at the vulva, and her pains grew stronger, but

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continuous. Her abdomen became very sensitive to touch and noticeably increased in size. She had intervals of comparative rest during the remainder of the night, but toward 6 o'clock A.M. she showed signs of exhaustion, fainted, and changed for the worse so markedly that I was summoned. The picture presented was one of shock, the abdomen was very sensitive to touch, and the uterus gave a peculiar boggy feeling upon palpation toward the right flank. Fetal sounds could not be detected. Some fresh clots were found in the vagina, although the whole amount lost was comparatively small. The fornix vaginæ felt boggy owing to a blood clot in the lower uterine segment, and gave the impression that the case was one of placenta prævia.

The cervix was closed and the old scar extending into the vault made the tissues unusually rigid.

The case was recognized as one of intrauterine hemorrhage, and the woman was so profoundly shocked that something had to be done at once.

Since every minute was against the patient, and the parts were so rigid as to make rapid dilation out of the question, the operation of vaginal Cæsarean section was undertaken at once. The vagina was incised, the bladder stripped away and pushed upward, and the incision carried to a point just above the internal os. The posterior lip was then incised, but the vault was not opened. Podalic version was then performed and a dead child delivered, together with quantities of blood clots and the placenta, which was completely detached. The wound was closed with catgut.

There was no tear beyond the smooth incision, and the hemorrhage, which was at no time worth stopping to check, could be practically controlled by firm traction on the lips of the cervical incision. The peritoneal cavity was not opened. A hot rectal injection was given after she was returned to bed, and whiskey administered generously throughout the day. She made an uneventful recovery and is now quite as well as before the operation. The operation

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was performed at the patient's house without the usual convenience of the operating room, but the results could not have been better.

HEART AND LUNG COMPLICATION. As to the efficacy of the operation in œdema of the lungs, heart complications, and the condition described as the pre-eclamptic state, there is little to say. I do not believe it is an operation that any obstetrician should deliberately advise, except as a last resort. More particularly is this true since it is a class of cases in which the matter of a half-hour or so, necessary to dilate by the Harris method, or metal dilators, would make any material difference.

Summing up the advantages of the method, it may be stated that:

1. In severe eclampsia, when the woman is unconscious between the convulsions, the cervix rigid and elongated, and delivery imperative, it is always preferable to abdominal Cæsarean section, and, under proper surroundings, may be preferable to metal dilators or manual dilatation.

2. In severe cases of accidental hemorrhage, when the cervix is closed, it is safer than the other methods of accouchement forcé, owing to the rapidity with which the uterus can be emptied, and should be given preference over abdominal hysterectomy, which is frequently advised.

3. It may be considered in other conditions where Cæsarean section is indicated, except in contracted pelvis, or dystocia arising from maternal or fetal disproportions.

It has not the disadvantages of an abdominal operation, the peritoneum need not be opened unless hysterectomy is to be performed for malignancy, and there is less shock than follows abdominal operations.

It is not more dangerous than attempting to rapidly deliver either by version or forceps, when the os is not fully dilated, if done under strict aseptic precautions.

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DISCUSSION.

DR. E. DENEGRE MARTIN, of New Orleans, La.—While I have had no experience with such cases as Dr. Miller has discussed, I desire to relate an experience I had a few weeks ago, which may possibly throw some light on the subject and show the feasibility of the operation. I do not believe in it as a routine practice; but I have in mind two cases, which, I believe, would have been benefited by this operation. As Dr. Miller truly says, the operation is one not to be undertaken by the general obstetrician. A man should have some knowledge of surgery, because there is danger of injury to the bladder.

The first case I recall was soon after I began practice. A woman was brought into the Womens and Children's Hospital, New Orleans, when I was an interne. She had been in labor eighteen hours. I found an extremely rigid cervix, which was dilated to the size of a dollar. In about two hours the pain came on with severity, but there was no further dilation of the cervix. I made up my mind to dilate, and, just before doing so, I noticed that she had a great deal of pain. I made an examination and found that a ring of cicatrix which had been formed by an erosion, at some time previous, had been torn from the cervix, and she was delivered in about half an hour. With a pair of scissors one could not have gotten a more perfect ring. This is one case where it would have been a material help to have done a vaginal Cæsarean section.

About a month ago I was called in consultation to see a woman who was in convulsions, a primipara, and it was necessary to empty the uterus at once. She was sent to the sanitarium. After getting her on a table and making an examination, I found the cervix was soft and dilated to quite a considerable size. With bimanual manipulation I introduced my hand into the uterus and delivered the body of the child without any trouble. To my astonishment, the head could not be delivered. I applied forceps, and, instead of having a single clean cut in the cervix, I had an extensive bilateral laceration.

I believe that in these two cases had I resorted to vaginal Cæsarean section, I would have delivered the woman more rapidly and with less trouble. There are, of course, cases in which it is necessary to do rapid dilation; in cases, for instance, where we should not give an anæsthetic, I do not hesitate to use spinal anæsthesia, and in my hands I have had absolutely no after-effects. I used spinal anæsthesia in one case where the woman could not be kept under the influence of chloroform for two hours with good effect. I believe Cæsarean section a means to help us, especially in cases of rigid os.

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Dr. I. S. Stone, of Washington, D. C.—We have had two vaginal Cæsarean sections recently in the Columbia Hospital, Washington, which were performed by the obstetrical staff. I was much impressed with the ease of the operation. There are very few difficulties attending it. In these cases there was very little hemorrhage, and there was satisfactory recovery of the patient. In his admirable paper I think he has said very little about the reasons for the operation. This woman was a primipara, weighing 200 pounds. She had been in a condition of coma, and I think had had numerous convulsions before she entered the hospital. The question arose as to what should be done, whether to resort to vaginal Cæsarean section or not. She was in the seventh month of pregnancy. Her urine was solidified when boiled. That was the only test we made at the time. Just before operation numerous casts were found in the urine. Very little time was spent in making an examination, and the operation required but a short time. The patient soon recovered from the anæsthesia, and had no additional convulsions. In a short time the urine was very much improved, and her mental condition was almost normal within twenty-four hours, perhaps in less time. I think the operation has a distinct field. However, it is not always that we will be able to find men in every city or in every small town who can do a Cæsarean section. There are more men who will do vaginal Cæsarean section with such indications as have been mentioned than the abdominal operation. For instance, anybody who can begin a hysterectomy, separate the bladder from the cervix with a pair of scissors, as very few instruments are needed, can complete the operation and deliver the patient. Vaginal Cæsarean section in the hands of a competent man in a hospital is all right, but many obstetricians will, of course, prefer the abdominal method. But there are certain indications and places where this operation ought to be done, and a child at the seventh month can be delivered by anterior incision of the cervix and of the lower segment of the uterus. At the eighth or ninth month it may be necessary to incise both the anterior and posterior lips. In every case that has been reported by every operator, so far as I have heard, hemorrhage has been strikingly absent, whereas, I must say for one I would have expected much more.

Dr. Joseph Taber Johnson, of Washington, D. C.—One great argument in favor of vaginal Cæsarean section is that it can be done at the patient's house with such preparations as can be made there, without causing alarm to the extent that it would be caused if a patient were bundled into an ambulance and transported to a hospital. For instance, if a patient were to be taken to a hospital in a police ambulance, I can readily understand that there would be objection on the part of the husband and other members of the family. So, it seems to me that the

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probability of many more cases being relieved at home, under an aseptic environment which could be readily obtained, is very great. As the peritoneum is not entered the danger of peritonitis would be much lessened; it is quite likely that this method may come into vogue and lives saved which might otherwise be lost, if the friends of the patient had to be convinced that Cæsarean section in the old-fashioned way was the only means of relief.

Dr. James A. Goggans, of Alexander City, Ala.—This is an important subject, but, at the same time, we must select the cases for such an operation as vaginal Cæsarean section. I have had only one case in which I attempted to do such an operation. My object was to try to deliver what I thought was a dead fœtus. The cervix in this case appeared to be comparatively healthy. My object was to dilate the cervix and deliver the fœtus. I introduced a dilator, and, to my surprise, it gave way under very light pressure and produced, I will say, an artificial Cæsarean section in a sense, that is, a section through the vagina up into the petitoneal cavity, and I at once thought of a carcinoma attacking the body of the uterus, but it did not show up so plainly at the cervix. I never saw such a profuse hemorrhage as I did in this case I thought the woman was going to bleed to death in five minutes. As rapidly as I could do so, I opened the abdominal cavity, with a view of completing the operation, and perform whatever method presented itself to me; but mainly to control the hemorrhage, I put a tampon in the laceration I produced by the dilatation, and I can say that I certainly did that section through the abdominal wall quicker than I ever did one before in my life. I put a tampon in the laceration temporarily to control hemorrhage, but when I came to examine the uterus I finally decided the case was inoperable. I managed to control the hemorrhage, and I now made a diagnosis of carcinoma, which I still think was correct, and allowed the patient to go on. She lived some four or five months. There is a class of cases where we may think that, so far as the vagina is concerned, a Cæsarean section per vaginam would be appropriate. A case to which I desire to refer was one that illustrates an opposite idea to that advanced by the essayist, namely, he said that abdominal Cæsarean section is especially applicable in cases of sepsis. In my case, where I did abdominal Cæsarean section, there was found in the fundus of the uterus, under the placenta, about two ounces of pus. So I wish to advance the idea that, in cases of sepsis demanding Cæsarean section, the operation should be completed by the operation of Porro, as this would be preferable to vaginal Cæsarean section.

Dr. J. W. Long, of Greensboro, N. C.—To those of us who are accustomed to see cases of dystocia, any method whereby delivery may be accomplished easily, rapidly, and safely is wel-

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come, and I shall study Dr. Miller's paper with a great deal of interest when it is printed.

However, I wish to enter a word of protest against the indication suggested by my friend, Dr. Martin, in the discussion in regard to the case he reported in which the os was sufficiently large for him to introduce his hand. While he did not say he would do a vaginal Cæsarean section in such a case, one would infer that he meant it from what was said. The question naturally arises, With an os sufficiently dilated and soft, large enough to introduce the fist, why should we not apply forceps and deliver? With the head engaged, this is a feasible thing to do, and I am unwilling for it to go out as the sentiment of this Association that this condition is an indication for doing vaginal Cæsarean section, however easy and safe the operation may be in the hands of such experts as Dr. Miller and Dr. Martin.

Dr. Rufus B. Hall, of Cincinnati, Ohio.—I was very much interested in Dr. Miller's paper, and think it covers the ground thoroughly. It points out the indications and contraindications for this operation; but it seems to me the greatest advantage in the operation in the cases indicated is that the ordinary obstetrician throughout the country should be competent and able to do this operation in the emergency that is always present. It is unnecessary in an operation of this kind for a man to be thoroughly versed in all the technique of all the different complications that are likely to occur in the various intra-abdominal and pelvic operations, to be able to perform this operation safely, and that is a great desideratum in connection with the operation. It puts the operation in these desperate conditions in the hands of those who are competent to practice obstetrics, and I think the rank and file are competent to do obstetrical operations.

Dr. Miller (closing).—I wish to refer to a point brought up by Dr. Long and emphasized by me in the cases where we cannot dilate the os sufficiently. We know that the os will dilate readily up to a certain point, and we feel we have plenty of room through which to deliver the child by podalic version or by the use of forceps, and I expect the result in Dr. Martin's case caused him to think that vaginal Cæsarean section would have been more justifiable than the operation he did. He thought he had plenty of room to deliver with forceps. He had dilated to such an extent that he could introduce his fist; he applied forceps, delivered carefully, yet a tear occurred on each side of the cervix, extending into the vault. The result was really more severe than the operation of vaginal Cæsarean section would have been.

I stated in my paper that we ought to make it clear that this is not an operation to be used when the case can wait. If it is an ordinary case of puerperal eclampsia, we know that if the woman has a convulsion and is perfectly conscious afterward,

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the case should be let alone or milder methods adopted. But if she grows rapidly worse, he can induce labor, and if delivery is imperative, this operation can be considered. In such cases the operation is indicated, and it is surprising how easily it can be done and the small amount of blood lost. If we do not think of performing this operation, we ought to remember the multiple incision method which also has Duhrssen's name connected with it. In the reports of one or two cases men have given credit to vaginal Cæsarean section, but they were simply cases in which multiple incisions were made. Where you have a rigid ring, by making three or four incisions in various portions of the cervix, you can introduce the hand or apply forceps, with which to deliver the child. That is the multiple incision operation. Vaginal Cæsarean section, on the other hand, consists in splitting up the anterior wall, first pushing up the bladder, and in cases after the seventh month it is best to slit the posterior cervical wall up to the vault or through it if necessary.

We have been advised against abdominal Cæsarean section in infected cases in which many examinations per vaginam have been made, or where we have attempted to deliver with forceps until the woman is exhausted. Now, I believe, vaginal Cæsarean section would be a good operation for this class of cases. Just why we have such an unusual death rate in cases in which we have attempted to deliver before doing an abdominal Cæsarean section is rather difficult to say, but such is the case. In these cases, for various reasons, except disproportions of the child or contraction of the vagina, I believe vaginal Cæsarean section will have a good field.

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DERMOID CYSTS AND FISTULÆ OF THE SACRO-COCCYGEAL REGION.

By Lewis C. Bosher, M.D.,
Richmond, Va.

During the past few years the writer has had occasion to operate on 7 cases of dermoid cysts or fistulæ of the sacrococcygeal region. The patients sought relief either on account of the presence of annoying exudation or after some traumatism had given rise to the formation of abscess, with the usual train of inflammatory symptoms. The cases operated on by the writer were all in male adults. An examination in each case revealed the presence of a small, fistulous tract in the median line over the coccyx, which, when probed, was found to lead into a cavity. On opening up the cavity with a scalpel, introduced on a grooved director, in at least 4 cases tufts of hair embedded in sebaceous matter were found. Several of the patients reported previous formation of abscesses in the same region, with relief following the spontaneous discharge of their contents; in other words, a history not unlike that given in fistula in ano. Final relief only followed complete extirpation of the fistula and sac.

On looking up the literature of the subject but little could be found in text-books or journals in the English language, and although written up to a greater extent by French and German surgeons, it still seems to the writer that the subject has not received as general attention as the common occurrence of these conditions would justify.

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Besides the fistulæ and dermoid cysts of the sacrococcygeal region, a simpler form of the same condition is recognized, as will be pointed out, in the depressions or dimples occurring in this region. We have, therefore, to consider three abnormalities of the sacrococcygeal region: 1. Simple depressions or dimples. 2. Fistulæ. 3. Dermoid cysts. These occur with greater relative frequency in the order mentioned. They do not represent distinct lesions, but are to be regarded as different developmental stages of the same anomaly.

These three conditions are universally acknowledged to be congenital, and in order to understand their origin it is necessary to consider briefly the embryological development of the spinal canal. As is well known, this is formed by an invagination of the ectoderm, and there persists for awhile a connection between the outer skin and the wall of the canal. Later the developing vertebræ which are of mesodermal origin, are shoved in between these ectodermal structures, thus breaking up this connection. Should anything interfere with this last-mentioned process, it is easy to see that there would remain an epidermal connection between the vertebral column and the skin which overlies it. This is most likely to occur in the sacrococcygeal region, since here closure of the spinal canal occurs last. Many theories have been advanced, differing in slight details from one another, but most of them are founded upon the facts above outlined, and to go into the matter more fully is beyond the scope of this paper.

The simplest form of anomaly thus occasioned is a mere depression or dimple in the median line over the sacrum or coccyx. According to French authors, this is found in a considerable proportion of all infants at the time of birth—in as many as one-third according to Dèsprès. In most instances this disappears later on, but even in adults it is found far more frequently than is commonly recognized. This simplest form of the trouble is not likely to cause even

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any discomfort if the parts are always kept clean, but where dirt or desquamated epithelium is allowed to accumulate, as well as the secretion of the sebaceous glands, with which the walls of these depressions are supplied, inflammation and symptoms of irritation arise. Even then these cases will rarely seek medical aid.

The congenital fistulæ of the sacrococcygeal region have the same origin as the depressions or dimples, merely extending more deeply, but while the former are seen most frequently in early infancy, often disappearing in later life, the latter are observed at all ages. They are almost invariably in the median line, more frequently over the coccyx than over the sacrum. They differ greatly in their size and depth, in their direction, in the amount of secretion, and in their proneness to inflammation or the development of other symptoms which cause the patients to seek medical aid. They may be so small as scarcely to admit the point of the finest probe, or so large as to resemble the anal opening. Lannelongue reports a case in which a woman, on being directed to take her husband's temperature by rectum, introduced the thermometer by mistake into a coccygeal fistula.

The simplest condition for which the physician is consulted in these cases of sacrococcygeal fistula is on account of a moist secretion which annoys the patient by soiling the linen, while in severer cases it is on account of acute symptoms, usually occasioned by traumatism or local irritation, accompanied by stoppage of the original fistulous tract, thus giving rise to inflammation, suppuration, abscess, and the formation of secondary fistulæ. It is to be noted that where this occurs the original congenital fistula is almost always located in the median line, while the secondary fistulæ are commonly situated laterally, this location being explained by the fact that pus can burrow more easily in the loose connective tissue at the sides of the spinal column than it can in the median line, where the skin is more closely bound down to the vertebræ.

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The original fistula is always lined with epithelium, and there are commonly present some or all of the additional structures of true skin—hair and hair follicles, sebaceous and sweat glands, and these give rise to excretory products which are likely to accumulate in the form of sebaceous material, cholesterin crystals, and either masses of normal epithelium or epithelium which has undergone fatty degeneration. The fistulæ often contain hair, as is the case with the dermoid cysts of this region.

These dermoid cysts of the sacrococcygeal region represent another stage of development of the same anomaly. They are formed by a dilatation of the blind end of a congenital fistula, thus giving rise to a cystic cavity, the walls of which have the same structure as the fistulous tract. These cysts may be discovered by the parents in very young children, or they may exist without attracting attention until they become inflamed in later life and suppuration arises with outward perforation, in which case the epithelial wall may be so completely destroyed that diagnosis of the original trouble, by the aid of the microscope, may be impossible.

From the above the common origin of sacrococcygeal dimples, fistulæ, and dermoid cysts is apparent.

The diagnosis of these cases is almost always simple, especially after one has encountered one's first case. A differential diagnosis has to be made between sacrococcygeal dermoid cysts and certain other affections of the same region.

Sebaceous cysts of the sacrococcygeal region are more superficial, the protuberance is more pronounced, they are adherent to the skin and freely movable over the subjacent tissues, while dermoid cysts are more closely connected to the bone than to the skin.

Spina bifida is discovered promptly after birth; it is of large size, the pouch is often umbilicated, the tumor is mobile, somewat painful on pressure, at times reducible, and nearly always translucent.

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Neoplasms in the sacrococcygeal region are rare, and when they do occur the differential diagnosis between them and dermoid cysts is plain.

Sacrococcygeal fistula may be confounded with fistula in ano, when the latter opens in the median line and over the coccyx, or with fistulous tracts leading down to tuberculous bone. In the first of these conditions introduction of a probe into the fistula with a finger in the rectum, will make the diagnosis clear. In the latter, the diagnosis is made by the progress of the affection, the nature of the discharge, the irregular appearance of the opening, and a probe introduced into the tract leads down to necrosed bone.

Prognosis is entirely favorable in the case of the simple depressions and dimples, which, as has been mentioned, often disappear spontaneously. Where they persist, if the parts are kept well cleansed, no trouble is likely to arise. In the case of dermoid cysts and fistulæ, spontaneous cure is not to be looked for, but complete cure only follows resort to surgical measures.

Treatment requires but few words. The usual methods resorted to for treating inflammatory fistulous tracts will seldom result in permanent cure. Complete extirpation of the fistula and sac must be performed to prevent a recurrence. It is, however, to be noted that this is not always possible, as in a case reported by Wette, where complete extirpation would have involved opening the spinal canal with serious injury to the nerves.

DISCUSSION.

Dr. E. Denegre Martin, of New Orleans, La.—The point brought out by the essayist is absolutely correct. I have seen three of these cases of dermoid fistula. In the first case I failed entirely in the treatment, simply because I incised and curetted the sac. There was a return in about six months. Excision was followed by a complete cure in the other two, so far as I know, and in connection with these cases of dermoid fistula, I want to report a case of interest on account of the size of the cyst.

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Dermoid cyst of sacrococcygeal region.

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About a year ago a colored girl, aged sixteen years, came to my clinic with a dermoid cyst of the coccyx. If my recollection is correct, it was forty-two inches in circumference and twenty-two inches in length. It came within about twelve inches of the floor when she stood up. I do not recall the weight of it. I had a photograph, with a view to having it published. This photograph showed the extent of the growth. We found it full of bone and braids of hair attached to the coccyx, one eighteen inches in length and thicker than my thumb. We found the attachment quite extensive, although the original attachment had involved the entire sacrum, and when it was removed the periosteum was exposed for a distance of eight inches in circumference, probably a little less. The girl, for some unknown reason, died within twelve hours after the operation. I say for some unknown reason, because I do not know whether it was from the shock of the operation and chloroform. The hemorrhage in this case was very profuse, and the combination of hemorrhage, the extent of the operation, and the chloroform may have caused death.

Dr. J. W. Long, of Greensboro, N. C.—These cases of coccygeal cyst are so exceedingly rare that the members naturally hear with pleasure each case that is reported. I have seen only two cases, one in my own practice. It had existed for quite a while; it had been opened a number of times, so that the cyst proper was destroyed and had left a fistula running up behind the sacrum. This occurred in the person of a young man, who was exceedingly fleshy, so that even with strong retractors and able-bodied assistants, it was a difficult matter to retract the parts sufficiently to thoroughly open, curette, and destroy the fistulous tract. This was done, however, after a good deal of difficulty.

The other case I saw at a clinic of Dr. Ochsner, at the Augustana Hospital, Chicago, during the month of last October. Ochsner followed the same method; first injecting the fistula with a solution of methylene blue, so as to help to identify the fistulous tract, and then he incised, curetted, and scraped away the fistulous tract, and in that way effected a cure.

Dr. Samuel E. Milliken, of Dallas, Texas.—My experience with dermoid cysts in the sacrococcygeal region has been limited to one case. In this case the cyst was incised some time before I saw the patient, and a very incomplete operation was done. When the patient came under my observation, some two years ago, there was a small sinus, and, under cocaine anæsthesia, an attempt at complete extirpation was made, and only a small lock or tuft of hair was found. No further report from the patient has been received, and, of course, my diagnosis of dermoid cyst was clear from the findings.

Dr. W. O. Roberts, of Louisville, Ky.—I have met with two

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cases of dermoid cyst, one of them being in a girl aged six years. The cyst was above the coccyx in this case, and was about the size of a hen's egg. On removing it, it was found to contain sebaceous material, with some hair in it.

The other case was that of a man in which there was a fistulous tract. He told me that the cyst had been opened and a lot of stuff removed from it, and at that time there was a slight discharge. On splitting it open, I found a large bunch of hair as long as my little finger, but no attachment.

Dr. J. B. Murfree, of Murfreesboro, Tenn.—I do not rise to discuss dermoid cyst of the coccyx, but to speak of a case of dermoid cyst that sprang from the sacrum, occurring in a stout man aged forty years and well developed. The tumor, which was about the size of a hen's egg, gave him a great deal of trouble from the irritation it produced and the annoyance it gave. I cut down upon it, removed the cyst, and in the centre of it I found a distinct tuft of hair. There was no fistula following its removal. I wish simply to report the case to add to the literature of the subject.

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HÆMATOMA OF THE OVARY.

By Magnus A. Tate, M.D.,
Cincinnati, Ohio.

The field for the study of hæmatoma of the ovary is somewhat curtailed, as case reports are rare; its causation and pathology has not been thoroughly studied, and so our knowledge of the whole subject is necessarily limited.

Etiology and Pathology. Broadly speaking, the cause is an interference with the circulatory mechanism of the ovaries. A study of the cases which I have collected shows us that three periods of life markedly predominate as a predisposing factor to the causation of hæmatoma of the ovary:

1. Before or during birth.
2. At or near the first menstrual flow.
3. Early adult or child-bearing period.

Under the first division Riedel[1] stated at a meeting of the Obstetrical Society at Berlin in 1857 that B. Schultze had reported a case of hæmatoma or hemorrhage into the ovary of a newborn child fully developed. Riedel in 1894 also reported a case similar to Schultze's, where the child was stillborn and hemorrhage had occurred in the left ovary.

Montgomery[2] says that when the hemorrhage is small it is known as ovarian apoplexy, and when large or frequently repeated, so that the ovarian stroma is practically destroyed and a blood cyst is formed, it is called a hæmatoma.

Pure ovarian apoplexies occur primarily as a result of venous stasis, inflammation, or general diseases, in which there is a tendency to hemorrhage, as scurvy, typhoid or

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puerperal fever. Riedel in his inaugural dissertation groups hæmatoma of the ovaries into four varieties, as follows:

1. Hemorrhage of the Graafian follicle (vesicular).
2. Multiple vesicular hemorrhage.
3. Extravesicular.
4. Intravesicular.

Under the first variety we understand it to be a small hemorrhage occurring in different follicles. These hemorrhages are not so extensive as to lead to rupture of a follicle, and also it cannot very well lead to a large hæmatoma of the ovary. This variety occurs in different infectious diseases, in burns, and in poisoning.

Winckel saw follicular hemorrhage three times after petroleum burns, twice in phosphorus poisoning, three times in typhoid, once in cerebral hemorrhage, in tuberculosis, and in heart-failure; the hemorrhagic follicles, however, were not so numerous as in petroleum burns.

Under the third variety of follicular hemorrhage—that is, extravesicular—is meant anomalies of ovulation, the extravasation before or after the eruption of the follicle, and this extravasation takes place either into the stroma or produces an internal hemorrhage, which is frequently followed by peritonitis, and this in time may terminate fatally or in an hæmatocele.

To illustrate these points I recite the following cases: Patient,[8] aged thirty-one years, married, gave birth to a seven months' fœtus nine years ago. Vaginal examination: lacerated cervix, uterus anteflexed; right ovary and the tube normal; left tube and ovary decidedly enlarged and very painful to touch, so that a careful bimanual examination was impossible without an anæsthetic. On January 7th the patient was seized with a violent pain in the left ovarian region and quickly lost consciousness. This pain subsequently spread over the whole of the abdomen. There being no improvement by the 10th of January, Dr. Boldt operated.

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On section blood serum gushed out, and the left ovary was found to have a rent in it 6 mm. in length which had spontaneously ruptured; the right ovary was normal. This case is one where the peritonitis was due to the rupture of an ovarian hæmatoma.

The following case is also reported where hæmatoma ruptured and caused an hæmatocele:

Mrs. S.,[4] aged thirty-five years, sixth para, had a sudden attack of pain in the left iliac region, followed by syncope and several gushes of clear, watery discharge. The following day uterine hemorrhage began and continued without intermission. Prior to onset patient had not menstruated for several weeks. On vaginal examination the uterus was pushed forward, followed by a large, doughy mass filling the pelvis.

Abdominal Section. Pelvis was found filled with dark blood, tubes normal, left ovary enlarged to the size of a lemon due to hemorrhage which had ruptured.

In the fourth variety (the intravesicular) the blood extravasation takes place into the follicle and is held within the ovary. It cannot burst, but it may increase to become a large blood cyst by repeatedly recurring hemorrhages.

Rollin described the hemorrhage which occurs in the second and third variety (that is, the multiple vesicular and the extravesicular hemorrhage) as hemorrhagic blood cysts, because they grow larger with each menstrual period.

Olshausen says (*Diseases of the Ovaries*) that no age precludes the formation of ovarian cysts of one or the other variety, but that we have no positive observations of them in fetal life. The latter part of this statement, however, is not correct, as Winckel saw a case where, at an autopsy on an infant dying four days after birth, cysts were found which had thin, transparent walls, were unilocular, and contained clear serum.

Doran at an autopsy found two large tumors of a seven months' fœtus, which died a few minutes after birth.

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Gessner also describes a cyst of the right ovary in a newborn infant. Hemorrhage frequently occurs in cysts as the result of twisting of pedicle.

The following cases illustrate the twisting of the pedicle and hemorrhage into cysts:

CASE I.[5]—Patient, aged twenty-four years. Had colicky pains in right ovarian region, followed by an immense swelling and patient suffered from shock.

Abdominal Section. Ten days after the first symptoms; an unruptured unilocular cyst with a twisted pedicle, enormously distended with blood. Death from sepsis.

CASE II.[5]—Patient, aged forty years; no children; married late in life. Was taken with symptoms of general peritonitis.

Section. A large extravasation of blood into the ovary, with a twisted pedicle. Result, death from sepsis.

There might seem to be an inclination to look upon the cause of hemorrhage as occurring in consequence of prolonged labor, because we often find evidences of engorgement in all of the internal organs in children that die during birth. The following case came under my care and has many points of interest:

Mrs. Annie F., aged twenty-seven years, menstruated at the age of fourteen, and up to the time of marriage healthy. Has had three living children, and a fourth delivery, when she gave birth to twins at the eighth month. The first three labors were normal in all respects, but in giving birth to the twins her health seems to have been shattered. Labor began on Sunday at 9 o'clock; pains were followed almost immediately by rupture of the amniotic sac. She was not delivered until the following Friday at 4.30 P.M. During all of this time patient claims that she suffered excruciating pain, was so exhausted that on several occasions she fainted, but with all of her pleading the physician let nature take its course. From the date of the birth of these premature children, which were born dead, she dates her illness. Since that time the menstrual flow has been almost constant for five

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years; a flow of one week, a cessation of from one to three days and then the flow returns. At no time was she free from pain of a bearing-down character.

Examination. Her physical condition was not good; very anæmic; heart beat rapid, and the least excitement ran it up to 120. On vaginal examination, which was very painful, I found a mass the size of an egg on the left and an enlargement the size of an orange on the right side.

On section a cystic ovary and hydrosalpinx were found on the right side (removed), and on the left a hæmatoma. The greater part of the left ovary with the hæmatoma was resected. Patient made a very easy recovery.

Examination and History Three Months Afterward. No pain; sleeps well; has a good appetite, and, with the exception of a slight tenderness on the right side, seems to be absolutely well.

Olshausen claims that the obstruction of the veins that carry the blood from the ovaries is the cause of the blood extravasation; in other words, varicosity of the ovarian vessels. At the menstrual period the expulsion of ovum by rupture of a Graafian follicle is always followed by a hemorrhage. This occurrence is purely physiological, but it can lead to a pathological condition if the hemorrhage become greater or continuous, especially so if there is an association of contraction of the tunica albuginea whereby the rent is closed. The hemorrhages then remain inside of the follicle, which increases in size, and as it enlarges the cyst wall naturally becomes thinner. Blood cysts of this nature vary in size from a hazel-nut to that of a hen's egg.

Along this same line Delafield and Prudden[8] concisely state that, aside from the normal hyperæmia of the ovaries during menstruation, the vessels may be congested in inflammation, in displacements with interference with the venous circulation, in certain diseases of the heart, etc., and may then be followed by a chronic inflammation. Normally the amount of blood effused into the follicle at the menstrual flow is

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small, it becomes solid, is decolorized, and then gradually is absorbed. Sometimes this effusion is much greater, and the follicle filled with blood is as large as a pigeon's egg. The blood may then remain in the follicle and still be absorbed and replaced by a serous fluid, or it may rupture and escape into the peritoneal cavity. Death may ensue from hemorrhage, or the blood may collect in Douglas' cul-de-sac and be enclosed in false membranes. Hemorrhage also occurs in follicles which have become cystic. Interstitial hemorrhage into the ovary sometimes occurs without a known cause.

It is not unusual to find in literature the report of a case where the symptoms of menstruation are present without the evidence of a menstrual flow externally. In such a condition the ovary may be the seat of an inflammatory condition or hemorrhage. The history of a vicarious menstruation associated with hæmatoma of the ovary is reported by Garrigues.[7] He presents a specimen of an imperforate uterus with a large hæmatoma of the ovary. Young woman, aged twenty years, had never menstruated. The vaginal examination: normal vulva and vagina, but above the vagina a large, round mass was felt.

On section the right ovary was slightly enlarged and showed up a fresh corpus luteum. The left tube normal, but it was bound to a cyst which nearly filled the pelvis. This cyst proved to be a hæmatoma of left ovary containing ten ounces of chocolate-colored fluid. This hæmatoma was an evidence of vicarious menstruation internally, which, according to the history, had been going on for four years. This patient suffered from epileptic seizures, coming on only at the time of the menstrual periods.

Pryor[8] said that it is known that hæmatoma may form rapidly, and that hemorrhage may occur so suddenly as to cause so rapid a destruction of the ovary, with severe pain located in one side, as to simulate an ectopic pregnancy. This pain may be of a dull, aching character and constant. Such

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is the history of a case reported by H. J. Boldt,[9] in which he made a vaginal section to remove a large ovary for the symptoms of constant pain. The enlarged ovary turned out to be a hæmatoma. Smaller accumulations of blood in the ovary and cystic degeneration produced localized pain, which is increased in a few days before menstruation; that is, at the time of ovulation.

Roger Williams[10] says that the mechanical disturbances in the circulation in fibroids nearly always produces congestion in the vicinity, and that the ovaries are almost always diseased. They are congested and enlarged owing to hyperplasia of the stroma, with overgrowth of the follicles, the former lesion predominating. Their bloodvessels are thickened and small cysts are frequent, and yet it is a curious phenomenon, and to me a rather unexplainable one, that in the majority of fibroids and ovarian cysts where for some time, as we all know, there has been a constant increase in the blood supply to the entire pelvic region, where in many cases the bloodvessels are enormously increased in size, we will find on section one of the ovaries normal or nearly so, at least not damaged enough to require extreme surgical interference.

The contents of blood cysts differ according to the length of time that they formed. It is well known that in the beginning the contents of the cysts is fluid blood; this in time becomes clotted, the fibrin deposited, and the fluid serum is absorbed. The hematin is decolorized, the fibrin entangled with the blood corpuscles, and then it becomes a rusty-colored, chocolate-brown mass. This mass in consistency is not unlike that of jelly, and resembles softened splenic tissue.

Bender[11] in his study of the blood gives the findings in 23 cases of various kinds of ovarian cysts, and proclaims that it is possible to determine the benign or malignant character of the cyst by examination of the blood contents. He says that the neoplasm is certainly non-malignant if the

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whites do not number more than 6000 to 8000, and when the proportion of reds is normal the presumption is against malignancy, even in cases of considerable leukocytosis. Bender states rather positively that only when the reds are below normal and the whites materially increased are we justified in assuming malignant cancer degeneration.

Among some of the rarer predisposing causes or associations of hæmatoma of the ovary might be mentioned diseased conditions of the blood, as purpura, mental conditions bordering upon idiocy, and dysmenorrhœa.

J. C. Janvrin[13] exhibited a specimen where a fibrinous clot was embedded within the centre of the left ovary, the remnants of an old hæmatocele. Case of dysmenorrhœa, pain in both ovaries and tubes, and endometritis. A catarrhal salpingitis of both tubes and abscess of right ovary and an old hæmatoma in left ovary were found by section.

A very interesting case reported by S. P. Kramer[13] is as follows: Patient married six months; never pregnant. Since patient was eight years old had had attacks of purpura at various times, and had had epileptic attacks, and mentally was a degenerate. Her father had syphilis; mother still living. Menstruation began at thirteen, was profuse, of two weeks' duration. Examination: left ovary enlarged, tender, and fixed. On section (double oöphorectomy), a hæmatoma the size of a goose-egg was found, weight 54 grams. The operation was without effect on the epilepsy or the purpura.

Another case associated with hysteroepilepsy is reported by G. M. Edebohls.[14]

Hæmatoma of the Ovary Diagnosticated by Exploratory Puncture. Patient, aged twenty-four years; married at nineteen; gave birth to a seven months' child shortly thereafter, not pregnant since. This patient had hysteroepilepsy ever since menstrual period began. The attacks were most severe at the menstrual periods. Pain in left groin constant.

Examination. Uterus slightly anteflexed; tubes normal. Right ovary normal, but bound down by adhesions. Left

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ovary enlarged, tender, and formed a tumor the size of a large hen's egg. Freely movable, but painful on pressure. An exploratory puncture yielded 8 grams of blood serum. Slight diminution in size and tenderness of tumor thereafter.

Diagnosis. Hæmatoma of left ovary and adhesions to the right ovary. This diagnosis was questioned by many of his audience. The co-existence of the hæmatoma and hysteroepilepsy in his opinion demanded an operation. Patient reported somewhat improved after section. Among active causes might be mentioned trauma and electricity.

W. Gill Wylie[15] reports a case of hæmatoma of the ovary in which the blood was evidently brought about by the use of electricity in trying to cure a fibroid tumor of the uterus. Hæmatoma of the ovary is nearly always associated with other pelvic lesions, as of the uterus, tubes, ovaries, and appendix.

Lawson Tait has made the statement that ovarian lesions cause uterine myomata, but, on the other hand, no less an authority than W. R. Williams says that they are the consequence rather than the cause of uterine disease.

The following case reported by R. H. Murray[16] illustrates the association of pelvic lesions to hæmatoma:

Case of Hæmatoma of Right Ovary; Abscess of Left Ovary with Pyosalpinx. Patient, aged twenty-seven years; married three years; has had two children. Patient's last confinement February 3, 1888; uncomplicated. On April 19th, fifteen weeks after, she had nausea and fainting; thought she was pregnant, although she was nursing the child, but her physician assured her to the contrary. Examination November 12, 1888. Uterus was fixed, enlarged, and tender; profuse leucorrhœal discharge. To the right of uterus an immovable tumor the size of a mandarin orange, not fluctuating, but tender; tube distended. Left tube and ovary enlarged and fixed, and a probable diagnosis was made of either an ectopic gestation or a pyosalpinx.

Dr. Thaddeus Reamy had a case where the ovary was

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enlarged and tender. On section hæmatomas of ovaries found, one ovary and tube removed, the hæmatoma of other ovary dissected out, leaving a portion of ovarian tissue. Subsequent history is interesting in that the patient married and had two healthy children.

Dr. Edwin Ricketts[17] read a paper before the Brooklyn Gynecological Society on the subject of "Hæmatoma of the Ovary," and stated that he had encountered 14 cases in his gynecological work, 6 of which he reports, and I give short histories of each of them:

Case I.—Mrs. S., aged thirty-one years, married, never pregnant. Diagnosis, large ovarian tumor. On section, ovarian tumor was found on left ovary, weighing fifty-nine pounds, and a hæmatoma of right ovary, involving its entirety. Both removed; recovery followed.

Case II.—Mrs. B., aged forty-two years; married; never pregnant. Had a tumor for ten years, which was known to patient. Section showed very large dermoid of left ovary, and a hæmatoma of the right ovary, involving all of the ovarian tissue. Recovery followed.

Case III.—Mrs. R., aged forty-one years; married; four children, youngest eight months old. Diagnosis showed an enlarged and very painful right ovary. On section a hæmatoma of right ovary involving all of the ovarian tissue was found, with an attached, suppurating appendix. Recovery.

Case IV.—Mrs. S., married, has had three children. Complains of constant pain in left ovary. Examination showed left ovary enlarged and very tender. On section a hæmatoma involving two-thirds of left ovarian tissue was found. Hæmatoma dissected out and recovery followed.

Case V.—Mrs. B., married; one child fifteen years of age. Has suffered from pelvic pain for four or five years. On section, by Dr. C. A. L. Reed, showed a hæmatoma of left ovary. Right ovary normal. One year after the pelvic pain returned. On section a hæmatoma of the right ovary was found and removed. Complete recovery.

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CASE VI.—Mrs. W., has one child four years old; dated her illness from the birth of this child. Examination in 1891. Enlarged right ovary, size of a tangerine orange, very tender. No tenderness of left ovary. Declined surgical interference. Re-examined her ten years later, in 1901, with Dr. Rufus B. Hall. The right ovary, enlarged to the size of a fetal head, was found, and the left ovary enlarged and very tender. On section by Dr. Hall a hæmatoma of both ovaries was found, the size above mentioned. Recovery.

Dr. W. Wenning gives me the history of the following case: Patient, aged forty years, had one child twenty-two years ago; suffered pelvic pain for years. Examination showed enlargement of both ovaries. The doctor states that he never had a patient who suffered so much from a vaginal examination, who was so exquisitely tender. On section two ovarian hæmatomas were removed; recovery.

Dr. Howard Kelly[18] reports a case of hæmatoma of the right ovary, with adherent Fallopian tubes.

Dr. N. S. Stone Scott[19] claims that part of the hæmatomas are due to an ovarian impregnation, with early death of the fœtus. Whether this theory is correct or not, at least we now know that ovarian pregnancy does exist and is no longer a fallacy, as authenticated cases have been reported.

CONCLUSION. In studying this variety of cases collected, we can at least present a few facts that may be of some importance. Klob states that in frequency the follicular variety is by far the commoner.

Scott says that in operating for ovarian disease hæmatomas are frequently found. In this I concur and do not believe that hæmatomas are so rare as the paucity of case reports in literature would lead us to believe.

We have seen that hemorrhage may collect in small, dark patches, or be so diffuse as to destroy the parenchyma or even the ovary itself. In size, hæmatomas vary from that of a hazel-nut to a good-sized orange. In no case reported was a diagnosis positively made before section, except the

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one reported by Edebohls, and this diagnosis was questioned by everyone who took part in the discussion.

The cases uncomplicated were free from fever, but pain was almost a constant symptom. Upon vaginal examination tenderness almost constant, sometimes the ovary was fixed, and pain frequently severe.

Schultze and Riedel reported hæmatomas in newborn infants. Winckel saw hæmatoma, the follicular variety, following petroleum burns, phosphorus poisoning, typhoid fever, cerebral hemorrhage, tuberculosis, and heart-failure.

Edgar reported a case where the hæmatoma ruptured and caused a pelvic hæmatocele, and Boldt a case where the hæmatoma ruptured and peritonitis resulted.

Two cases of hæmatoma were reported in which the hæmatomas became cystic and had twisted pedicles.

Garrigues gives the history of a case associated with vicarious menstruation.

Janvrin reports a case of dysmenorrhœa where on section salpingitis of poth tubes, abscess of right, hæmatoma of left ovary, and Murray a case of abscess of left ovary and hæmatoma of right.

Kramer reports a case associated with purpura and epilepsy, and Edebohls one where hysteroepilepsy complicated.

Wylie had a case where electricity was the probable cause.

Tate reports a case following a long, tedious labor.

Reamy reports a case where one ovary was removed and a portion of the other, and subsequently the patient had two children.

Ricketts reports a case associated with a large ovarian tumor; also one with a dermoid, one with a suppurating appendix, and one where the left hæmatoma was removed, the right being normal, and in one year later the right ovary had to be removed for a hæmatoma.

Wenning operated upon a case of double hæmatoma; the patient suffering from excruciating pain when an examination was made.

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The age of child-bearing women who are afflicted with hæmatoma of ovaries varies from fifteen to forty years, and the left ovary seems to be oftener affected than the right.

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DISCUSSION.

DR. HERMAN J. BOLDT, of New York City.—I am sure we feel indebted to Dr. Tate for his scholarly paper, and for the unusual amount of research displayed in looking up the literature of the subject.

Follicular hæmatomata of the ovary are quite common. A condition which is rather unusual is the large hæmatoma, or the other form of hæmatoma which takes place so suddenly that a rupture occurs. As near as I can remember, in the case which Dr. Tate narrated, and which I reported some years ago, peritonitis occurred as the result of rupture of the hæmatoma.

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The theory advanced by Olshausen, that hæmatoma is due to varicosity of the vessels, is, I believe, correct. I do not recall the details of the pathological findings. An investigation was made in Dr. Heitzman's laboratory at the time, and that was the conclusion we came to. The rupture of a hæmatoma and symptoms simulating a ruptured extrauterine pregnancy do sometimes occur.

I operated upon a patient five or six years ago in whose case I felt quite sure that we had a ruptured ectopic pregnancy, although the shock which was present was not as profound as we usually find in a complete rupture of tubal gestation. However, the shock was quite marked. The anæmia was pronounced, and the general symptoms were those of intraperitoneal hemorrhage. On opening the abdomen we found quite a large quantity of blood, and the cause of the hemorrhage was due to a ruptured hæmatoma. I do not remember whether the specimen was examined or not. So much is certain, that it is an utter impossibility to make a positive diagnosis as to the presence of an ovarian hæmatoma, and when it is present and assumes considerable size, the symptoms are sufficiently severe in most instances to require surgical intervention.

Dr. Henry T. Byford, of Chicago, Ill.—I would like to say a word or two about small hæmatomata or hemorrhages in the ovary. Judging from the ovaries I have removed, or have seen at operations, or have resected, I should say that the most common pathological condition connected with them is a perioöphoritis, either with or without adhesions. In these cases, when menstruation develops, there is often considerable hemorrhage in the smaller follicles and sometimes in the ovarian substance. Ordinarily, these hemorrhages are absorbed, but sometimes they are not, and a small hæmatoma remains.

I think one of the most common causes of ovarian hæmatoma in nulliparæ comes from the utrus. Patients who have small cervices and dysmenorrhœa, not necessarily stenotic cervices, have dysmenorrhœa until the menstrual flow has become well established. Each period adds to the congestion of the ovaries, until finally oöphoritis and even ovarian hæmatoma results. Sometimes the hæmatoma attains considerable size. If there is a fibroid tumor in connection with adhesions it is apt to occur.

Dr. Rufus B. Hall, of Cincinnati, Ohio.—I want to thank Dr. Tate for his very excellent paper, and for so thoroughly reviewing the literature on this very interesting subject. A review of the varieties of the condition enumerated by the essayist would not be possible in the time allotted in a short discussion.

The interstitial variety is interesting from a pathological standpoint, but from a clinical standpoint it does not matter very much to the operator, because he will deal with the condition

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which necessitates the operation when the abdomen is opened. I desire to refer to that condition mentioned by the essayist—of large hæmatoma of long standing. He said that usually the ovary is the size of an orange in such cases. Occasionally we see a condition of hæmatoma of the ovary in which the ovary is very much larger. I recall a case in the wife of a physician, aged thirty-six years, and the mother of one child, aged fifteen years. She had never had a miscarriage; she had been in poor health for two years or more. She had gradually developed a pelvic and abdominal tumor. She had several attacks of slight peritonitis which lasted for a few days, confining her to bed, and corresponding with the menstrual periods, which were not excessive, but very painful. At the time she came for operation, the pelvis was filled full and the tumor extended well above the brim of the pelvis on one side (I have forgotten which). A diagnosis was made of ordinary cystic tumor, with inflammation in the pelvis, and operation was considered imperative. At the time of the operation the tumor was adherent; it was a hæmatoma of the ovary on one side, which contained more than two pints of this dark, chocolate-colored fluid. The tumor was removed. The uterus was its natural size. On the other side, underneath the first tumor, was the second ovary, there was a hæmatoma about the size of an orange, which was filled with the same character of fluid. This patient died from sepsis following the operation.

There is another condition which we should consider clinically of vast importance in connection with hæmatoma of the ovary, and that is these cases of neglected fibroid tumors of the uterus, where the patient will not submit to operation until she is compelled to from great suffering on account of the pressure of the tumor. She has had perhaps repeated attacks of inflammation lasting for a few days or a week or two, and, after long suffering and carrying a tumor for six or eight years, she comes for operation. We find one ovary riding out of the pelvis, the other beneath the tumor and enlarged; we may have in such a case a hæmatoma glued down to the surrounding parts containing three, four, five, or six ounces of this dark, chocolate-colored fluid. This emphasizes a point brought out by Dr. Byford, namely, that we get hemorrhages in ovaries when imprisoned by adhesions, and my experience has been that this tarry fluid in these cases of hæmatoma of the ovary which come late for the operation is oftentimes infected. It is sometimes impossible to remove the tumor without rupturing the hæmatoma, because some manipulation that pulls the tumor out of the pelvis liberates the tarry fluid and smears it around the field of operation, and if infected with colon bacillus, the patient may have a sharp attack of peritonitis and die. This point should be considered in connection with these cases of fibroid tumor and hæmatoma.

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Dr. Charles L. Bonifield, of Cincinnati, Ohio.—I quite agree with the remarks made by Dr. Byford, that this condition in the great majority of cases is largely inflammatory. It is not unusual for us to find, in connection with hæmatoma of one ovary, a salpingitis on the same side or a cystic ovary on the other. In the great majority of cases we can find some evidence of inflammation around the ovaries and tubes. The cases that he referred to, where a patient suffers from dysmenorrhœa, are, in my opinion, instances of maldevelopment of the uterus and of the ovaries.

Some years ago I had occasion to write a short paper on the undeveloped uterus, and in it I took the position that in those patients who come to us at the age of twenty-five or thirty years for the relief of dysmenorrhœa, and in which we find the uterus with a long, narrow cervix and a dilated body, the cause of the trouble is primarily lack of development of the uterus. If such a patient were examined when she was sixteen, the whole uterus would be found to be undersized. The lack of drainage caused by the narrow cervix produces dilatation of the body, so that it is found larger than normal. Very frequently the ovaries share the lack of development, and I have found that such ovaries are prone to undergo either cystic or hemorrhagic degeneration.

With the larger hæmatoma I have had an unusual experience in the last six months. The patient was a missionary, who returned from China to be operated upon for a tumor in the abdomen. I examined her and made a diagnosis of fibroid tumor, about the size of a cocoanut, and, as her general health was poor, I advised her waiting two or three months to be built up before operation. She did so, and at the appointed time entered the hospital in much better condition. The tumor was unchanged. I opened the abdomen and was surprised to find the tumor to be a hæmatoma of the ovary. It was removed rapidly and without difficulty, as far as we could determine aseptically. The patient left the operating table in good condition, but she did not awake from the ether as she should. In the evening I stopped at the hospital to see how she was, and she was asleep. I felt her pulse and it was normal. I did not arouse her. A few hours later the interne telephoned me that she was still sleeping, and could not be readily aroused. She died the next day without ever really becoming wide awake. At times she could be aroused with difficulty, but was never exactly conscious. We were unable to get a post-mortem examination. I do not know the cause of death in this case, but I am inclined to think it was an embolus that caused it.

Dr. A. Palmer Dudley, of New York City.—I think this condition of hæmatoma of the ovary is of much more frequent occurrence than we have really supposed. I have seen quite a good many of them, and in those I have examined carefully I

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found the external capsule of the ovary changed into a cirrhotic condition, so that it was almost as tough as the capsule of a fibroid tumor. Under such circumstances, hæmatoma of the ovary may be of very frequent occurrence, because of the failure of the proper escape of blood from the ovary that follows the escape of the Graafian follicle.

Another cause of hæmatoma of the ovary, which has not been recognized to any great extent, is angioma of the bloodvessels of the ovary. That question is now being looked up thoroughly by a friend of mine, and the report will be issued for distribution in a short time.

I want to relate briefly one typical case that came under my own observation. The wife of a policeman came to my clinic to be relieved of a retroversion. She made me promise not to remove her ovaries and tubes, as she said her husband would leave her if I did. I opened her abdomen, broke up adhesions, lifted the ovaries and tubes up, and found them both diseased on each side. So to keep my promise as nearly as I could, I took out half of each ovary and half of each tube, and did a suspension, and kept her under observation. She came back to the clinic one day, and one of the attendants introduced a very large speculum into the vagina, which caused pain and shock, and when she came to me I supposed she had beginning ectopic pregnancy, as she said she had missed her "changes" for two or three weeks. I put her in the hospital, reopened the abdomen, and found a ruptured hæmatoma of the left ovary. I was obliged to sacrifice that ovary. I also freed the right half of the tube and half of the ovary from its adhesions. The woman recovered and went to Pittsburg. I think it was seven or eight months later when she returned and wanted me to examine her again, saying that she thought she had a tumor on the other side. To my surprise, I found her about six months' pregnant, from one-half of the right tube and one-half of the right ovary only. My assistant delivered her of a fine baby, weighing six and a half pounds, while I was abroad. That is one typical case.

The most pronounced case of hæmatoma of the ovary I have ever seen in all my practice was a double hæmatoma of the ovary and tube in the practice of my confrère, Dr. Brothers. This woman was having hemorrhages, and the doctor made an abdominal section, believing she had a fibroid tumor on both sides. I assisted him in the operation, and, much to our surprise, we found two shells of the ovaries and two shells of the tubes. You may not understand, perhaps, what I mean by that expression unless I explain, and if you will allow me I will explain by diagrams. This (indicating) was the shape on either side. The fimbria was glued to the side of the ovary at this point and at that point (indicating) the rest of the ovarian

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structure was a mere shell. We had to deal with that, and a suprapubic hysterectomy was made. This was the most pronounced case of double hæmatoma of the ovary, involving the entire structure and dilating the tube at the uterine end, that it has been my privilege to see. We can only reason the matter out in this way, that inflammatory action glued the fimbriated extremity to the capsule of the ovary, preventing the rupture of the Graafian follicle.

DR. GOGGANS.—You stated that you removed the ovary on one side. Did you remove a part or half of the tube also?

DR. DUDLEY.—I left just so much of the tube, not over an inch possibly.

DR. P. F. CHAMBERS, of New York City.—I was unfortunate in not hearing this paper; consequently I cannot take up the different points in it and discuss them.

I agree with Dr. Dudley that hæmatoma of the ovary is very much more common than it is generally supposed. Formerly, when tumors were allowed to grow to a considerable size before operation, large hæmatomata were quite common. Now we do not see them so often, because these cases are operated upon before the tumors commonly reach the size of an orange. I frequently see small tumors of the ovary in my own service, and I have seen two cases in the practice of my confrères in which operation swere done for ruptured ectopic gestation, but these cases turned out to be hæmatomata. I have no doubt that many cases of ectopic gestation, so considered, would turn out to be cases of hæmatoma of the ovary if the patients were thoroughly examined.

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THE PATHOGENESIS AND SURGICAL TREATMENT OF TUBERCULOUS PERITONITIS.

WITH REPORT OF CASES.

By J. E. Stokes, M.D.,
Salisbury, N. C.

The present understanding of tuberculous infection of the peritoneum has been attained very gradually. As early as a century ago some of the anatomical features of the affection were noted by several observers, and as late as 1825 chronic peritonitis was first assigned to a tuberculous origin.

It was not until after 1882–84, when the first important publication of Koch was made, in which he described the tubercle bacillus and its relation to the lesions of tuberculosis, that the pathogenesis of tuberculous peritonitis first began to be investigated.

Following immediately on this, König (1884) called attention to the influence which the abdominal incision exerted on the progress of the infection.

Pathogenesis. Tuberculosis of the peritoneum, accompanied by inflammatory process, with or without exudation, exists in several forms, which have been variously classified. Though authors differ in their classification, there is no important difference, as the same pathogenesis is recognized and acknowledged by most authorities; so that it is more of a clinical than a pathological variance. Galvani makes five, while Aldibert eleven divisions and subdivisions. Three varieties, however, are most generally described. Gee divides

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tuberculous peritonitis into four forms: 1. Adhesive. 2. Suppurative. 3. Tympanitic. 4. Ascitic.

Another division has been made as follows: 1. Ascitic form, tuberculous ascites. 2. The dry fibrinoplastic form, adhesive tuberculous peritonitis. 3. The ulcerative or suppurative form.

Senn states that, according to the intensity of the infection or the degree of susceptibility of the patient to the action of the tubercle bacillus, the disease assumes one of the following pathological forms: 1. Tuberculous ascites. 2. Fibrinoplastic peritonitis. 3. Adhesive peritonitis.

Osler's histological and at the same time very succinct classification is as follows: 1. Acute miliary tuberculosis, characterized by a sudden onset, a rapid development, and a serous or serosanguineous exudation. 2. Chronic tuberculosis, characterized by larger growths, which tend to caseate and ulcerate, leading often to perforations between the intestinal coils and a purulent or seropurulent exudate, often sacculated. 3. Chronic fibrotuberculosis, in which the process may from the outset be subacute, or may represent the final result of the miliary form. There is little or no exudation, and the tubercles are hard and pigmented.

There exists the closest analogy between tubercle as we see it on the peritoneum and as it occurs in the lung; the fresh miliary eruption, the caseous, ulcerating masses, and the chronic, fibroid, pigmented nodules may be studied with equal facility in either structure.

The tubercles are grayish in color, varying in size from exceedingly small, punctiformed nodules to nodules as large as millet seeds.

These nodules in the miliary form may completely cover the parietal and the visceral layers of the peritoneum, the omentum, the mesentery, and especially the capsule of the liver and spleen, and in the female the pelvic organs.

Again, they may be localized, or coalesce by eruption into large nodules or even masses. Suppuration occurs only

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through a secondary mixed infection, with some one or more of the pyogenic organisms. On microscopic examination, the nodules or tubercles consist of epithelioid cells and numerous giant cells, which may or may not contain the tubercle bacilli.

The bacilli may be demonstrated in the exudate; but not invariably, and at times it is exceedingly difficult, even impossible, to detect them in the tuberculous nodules. Though the bacillus cannot always be demonstrated in genuine tuberculosis of the peritoneum, it is generally accepted that the infection owes its specific character to the entrance of the tubercle bacillus into the peritoneal cavity.

The method and means by which the bacillus reaches the peritoneum is one of the most interesting features of the entire consideration of the infection.

Small miliary tubercles may develop in the peritoneum, the bacilli having found entrance to the bloodvessels and lodged in the capillaries on the surface of the membrane.

The condition thus produced has been recognized as tuberculosis of the peritoneum, or primary tuberculosis, in distinction to the inflammatory or more chronic form—tuberculous peritonitis.

This distinction, though it involves a pathological difference, has but little practical value, the first condition rarely ever presenting clinical symptoms. A primary tuberculosis of the peritoneum is the rarer form. Thus, in several series of cases it occurred in 2 out of 226; 1 out of 46. Osler, it is true, found 5 among his 17 cases, while Rilliet and Barthez 12 out of 22 in their statistics, the infection appearing as primary in the peritoneum of children.

Another and most important way of transmission of the infection is through the lymph channels, the baccilli having gained entrance from some other infected point, acting as a focus of distribution.

This passage of micro-organisms through the lymph channels has been described by several authorities.

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Through this mode of distribution of the infection may be added those cases of infection in which the lungs are primarily affected, while the peritoneum is the only abdominal viscera infected.

A group of cases has been noted in which the infection is confined to the serous membrane, the infection being at one time primary in the peritoneum, and that of the pleura or pericardium secondary; while in another instance the reverse is the case. Finally, the means of infection by direct continuity from primary foci in or near the abdominal cavity may be mentioned. In women tuberculosis of the tubes, ovaries, and uterus and genitourinary tract are very frequent primary foci for the distribution of the infection.

Among other primary foci may be noted suprarenals, bone, skin, psoas abscess, caries of the vertebræ, solitary tubercle of spleen; bronchial, retroperitoneal, and mesenteric glands.

Space will not permit the discussion of the causal relation existing between cirrhosis of the liver, pregnancy, nor tuberculosis of the intestines and tuberculous peritonitis. Regarding these a very exhaustive study, with a full canvass of the statistics, has been made by a number of prominent authorities. The series of the six following cases is entirely too limited and restricted to be of value, save as a report illustrating some interesting clinical features of the disease, while showing the value in at least some instances of abandoning medical for surgical treatment. The synopses of these cases, omitting the clinical histories, are as follows:

CASE I.—Length of time of cure, five years having elapsed without any indications of or return of the former tuberculous infection, patient's present health being perfect.

CASE II.—Complete disappearance of every indication of former tuberculous infection in less than six months' time. Shown by condition of peritoneum on second operation.

CASE III.—Complete removal of all localized abdominal symptoms by operation, though there were extensive tuber-

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culous involvement of lungs and pleuræ. Very marked general improvement for nearly one year.

CASE IV.—Instant relief by operation and total absence of further peritoneal involvement for over one year following operation.

CASE V.—This case rapidly failed under rigid medical treatment and hygienic care. No benefit from operation. This case was probably one of general miliary tuberculosis.

CASE VI.—This case progressively declined under medical treatment and hygienic care. Premonitory symptoms two years before final operation. Demonstrated in the painful and very scant menstruation—in fact, cessation of menses. Histological examination negative at this time. Two years later at final operation tubercles demonstrated in tissue of uterus. Immediate relief by operation, with progressive improvement still continuing.

CLINICAL REPORTS.

CASE I.—*Description.* Chronic tuberculous peritonitis; discrete tubercles on peritoneum, both parietal and visceral; of tubes, ovaries, and uterus, with adhesion of small intestines to pelvic structures. Slight ascites salpingitis, and perioöphoritis.

Operation. January, 1901. Hysterosalpingo-oöphorectomy, with release of adhesions; gentle mopping of peritoneum and drying out of peritoneal cavity. No drainage. Recovery. Dismissed on the thirtieth day.

History. Mrs. J. J., white, aged thirty-one years, housewife. III.-para; no miscarriages. Family history negative. No tuberculosis. Present illness three months' duration, though had not been up to usual mark for nearly a year. First noticed languor and inability to make usual amount of exertion. Tiring quickly. Lost flesh and appetite. Constipated, with painful defecation. Noticed abdomen seemed fuller. Pain of a sharp, colicky nature, through abdomen generally, most marked through lower zone. Men-

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struation regular, but had gradually decreased. Fever with evening exacerbation. Face flushed, thin, and drawn.

Examination. Abdomen slightly distended, dull, not sensitive to pressure. No mass nor tumefaction. No tuberculous lesion found in other organs.

Per Vaginam. Uterus fixed; tubes and ovaries on both sides adherent; enlarged, sensitive.

Histological Examination. Typical tubercles demonstrated in tissue of tubes. No organisms found.

CASE II.—*Description.* First: Acute miliary tuberculous peritonitis; parietal and visceral peritoneum studded with miliary tubercles; sudden onset, with serohemorrhagic exudation in pelvis. Second: Acute tuberculous pyosalpinx, with surface of uterus and bladder peppered with miliary tubercles. Surface of liver and spleen not involved. General adhesion throughout pelvis.

Operation. October, 1903. Removal of tubes and ovaries. Median line drainage. Recovery. Dismissed on the twenty-eighth day.

History. Mrs. L., white, aged nineteen years, housewife. Married two years. Nullipara; no miscarriages. General health for last year only fair. Menstrual history normal. Family history good, save that a sister has tuberculous involvement of right apex. Past history excellent. First noticed pain in lower left side of abdomen for last three months or so. Rode horseback, however, constantly up to a week or so to having to go to bed. Two weeks previous to operation remained in bed on account of pain and fever. Locomotion difficult and painful. Pain became suddenly more severe in lower abdomen, with fever, slight nausea, constipation, and general weakness; loss of appetite and some general nervousness.

Examination. Patient thin, poorly nourished; abdomen slightly rigid, with dulness on palpation.

Per Vaginam. Uterus fixed. On left side a mass size of a lemon, boggy, adherent. On right side small cystic mass,

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adherent. Posteriorly marked fulness, hard, board-like in consistency.

NOTE.—This patient had a smooth, uninterrupted convalescence, and began to gain in strength and flesh, with gradual relief of all abdominal symptoms. Six months later, May, 1904, while at Newport, was seized suddenly with acute pain in right lower abdomen, marked tenderness, with an area of induration to right of median line. There was a sharp rise of temperature, patient feeling generally ill. On vaginal examination there was a fulness in right fornix, with great sensitiveness. Immediate operation advised by Dr. Bull, N. Y. Small abscess in right cornu uteri was found. There was absolutely no evidence of former tuberculous invasion present, there being a total absence of any tubercles on surface of parietal and visceral peritoneum or on uterus. Subsequent condition of patient excellent.

CASE III.—*Description.* Chronic tuberculous peritonitis; suppurative tuberculous appendicitis; entire surface of parietal and visceral peritoneum covered by large nodules, with general adhesion of intestinal coils, and a thick, purulent exudate; peritoneum much thickened, with localized abscess about appendix; localized tuberculous lesions in right lung; mild pleurisy of either side.

Operation. December, 1903. 1. Median line incision. 2. Removal of appendix; vertical incision in right side of abdomen; removal of all purulent exudate as far as possible. Drainage.

Convalescence is interrupted by postoperative pneumonia; extension of pleurisy; fecal fistula. Final improvement for a time. Death nine months after operation, from pulmonary tuberculosis.

Mr. J. V., white, aged thirty years, medical student. Past history good. Family history good. Was in perfect health one year ago. Of unusual size and strength, weighing over 160 pounds. First noticed slight cough and loss of flesh. No especial change took place, however, for several months,

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up to within a month of operation. Cough slightly increased, with progressive loss of flesh. This was followed by pain through lower abdomen, with soreness. Pain first dull, then sharp, cutting, intensified in ileocæcal region. Began to have temperature of 100° to 102°, with pain and soreness localized to right iliac fossa. Exertion and locomotion became painful. Cough increased; temperature more constantly high, with night-sweats.

Examination. Apex of right lung shows localized tuberculous area; limited pleurisy on either side. Abdomen was resistant and rigid, with well-marked area of induration circumscribed over ileocæcal region.

Histological Examination. Well-marked tubercles demonstrated in wall of appendix. No organisms demonstrated.

CASE IV.—*Description.* Acute tuberculous miliary peritonitis, with a sudden onset, rapid development, and a very large, serohemorrhagic exudation. Entire parietal and visceral peritoneum, surface of liver, and spleen studded with miliary tubercles. Enlarged and greatly thickened appendix. No other tuberculous focus discovered. Hydrocele of left cord.

Operation. January, 1904. Median line incision; evacuation of peritoneal cavity; removal of appendix; no drainage; recovery.

History. Mr. W. M., white, aged thirty-three years, mechanic. Family history: mother died of tuberculosis. Past history excellent. Health good up to two months ago. First noticed pain in back and right side, with loss of strength and flesh. Good digestion. Bowels constipated. No fever. Slight night-sweats. Later noticed tugging sensation along inguinal canal, with slight fulness in scrotum. Applied a truss on supposition of hernia. Pain then started up in back; continuous loss of flesh; constipation became more marked and general health fell below par. Pain increased, arising in right side of abdomen, and radiating across and through bowels, with progressive enlargement along inguinal canal. Then patient began to notice for the first time some fulness

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in the abdomen. This steadily increased until locomotion became difficult, and patient found it almost impossible to lie down on account of intense pain along cord into scrotum. The swelling along cord would disappear on patient's lying down, increasing markedly when in the erect position.

Examination. Distinct distention of abdomen with slight tympany. Marked fulness along left inguinal canal, which bulged out, down into the scrotum, when the patient stood erect. No impulse on coughing, transparent, entirely disappearing when the patient took the prone position.

Histological Examination. Section from excised portion of peritoneum and also from tissue of appendix showed typical tubercles. No organisms demonstrated in exudate.

CASE V.—*Description.* Acute miliary tuberculous peritonitis, with sudden onset, a rapid development, and a very large collection of a free, serous exudation. Entire parietal and visceral peritoneum; surface of liver and spleen studded with miliary tubercles. No other tuberculous foci found. Hydrocele of left cord.

Operation. May, 1904. Median line incision with free evacuation of fluid; drainage; slight improvement, abdomen soon filling up again; death several months later.

History. Mr. W. W., white, aged forty-five years, weaver. Family history: mother, several brothers, and one sister died of tuberculosis. Past history good. First noticed pain in upper abdomen three months ago; severe and constant. Started in with chill; pain increased and extended over entire abdomen. Rapid loss of strength and flesh. Abdomen began at once to enlarge, became tender, with soreness throughout generally. Bowels constipated; night-sweats, with temperature ranging from 100° to 103°. About this time noted enlargement along right inguinal canal, extending down to scrotum, which became fuller on patient's standing up. Transparent, no impulse on coughing, and immediately disappearing in prone position, with, however, distinct increase of pain.

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Examination. Abdomen dull on palpation. Slight wave produced on percussion. Moderate but general tenderness on palpation. Marked distention of right side of scrotum, extending up along course of right cord. Transparent, increased by erect position. Lungs and pleuræ normal. No organisms found in effusion.

Case VI.—*Description.* Chronic tuberculous peritonitis, with general intestinal adhesions and purulent exudate. Entire surface of parietal and visceral peritoneum, liver and spleen, tubes, ovaries, uterus, and bladder studded with distinct nodules of large size. Acute tuberculous appendicitis.

Operation. August 19, 1904. Hysterosalpingo-oöphorectomy; removal of appendix; drainage per vaginam; large pelvic abscess following closure of drain tract; secondary puncture, with through-and-through drainage; recovery with fecal fistula; final spontaneous closure of fistula.

History. Mrs. J. H., white, aged thirty-two years, housewife. Married twelve years; nullipara; no miscarriages. Patient was seen two and one-half years ago for scant, practically cessation of menses. Cervix was dilated and uterus curetted, followed by regular menstruation, some increase in amount, and disappearance of pain.

Histological examination of scrapings negative.

Second visit: Past history good after first treatment. Up to that time had been poor, with general weakness and languor, and menstrual distress for a number of years. Was feeling unusually well up to five months ago, at which time began to feel again weak, with no appetite nor energy. A month later had a sudden attack of pain and soreness through lower abdomen, but no consistent cessation of these symptoms. Patient never felt well nor strong, with more or less constant soreness through pelvis and lower abdomen. Locomotion exceedingly painful. Just before or following menstruation a distinct attack would come on. Pain became so intense as to nearly bend patient double. There was no distention; slight nausea; fever 103° or more;

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night-sweats; attack lasting several days. This followed by marked tenderness and soreness.

Examination. Patient well nourished, slightly anæmic. Abdomen flat, slightly hard, and resistant on palpation.

Per Vaginam. Uteras forward, movable. Slight sense of resistance on either side, with fulness. No marked adhesions detected. Distinct fulness posteriorly.

Histological Examination. Typical tubercles found in wall of tubes. No organisms demonstrated in tissue nor exudate.

SURGICAL TREATMENT. Both the diagnosis and treatment of tuberculous peritonitis may be difficult to determine. In marked contrast to the diagnosis, however, the most generally discussed, and one of the least-settled points, is the appropriate treatment in several forms of the disease. That an apparent cure, with restoration to health, may be brought about through surgical means is not now questioned.

That a spontaneous recovery, with a complete disappearance of all symptoms through medical treatment and hygienic care, may also occur, is unquestioned.

The fact, however, yet undetermined is, whether in certain forms of tuberculous peritonitis can the best results be produced, with a permanent cure, through operative procedure; or, on the other hand, may not the best results be procured, both immediate and remote, by avoiding an operation? A decision which is of great importance to the patient and of wide interest to the surgeon.

The final conclusions reached regarding the surgical treatment of the various forms of tuberculous peritonitis vary greatly, by both medical and surgical advocates.

The decision for or against surgical interference in tuberculous peritonitis, as a general routine pratice, is greatly influenced by whether the viewpoint has been reached through successful surgical results, or whether the result has been obtained through a study of the clinical aspects of the disease in some cases, substantiated by post-mortem examinations in others.

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Comparative statistics of these respective results are as yet unsatisfactory, so that a stimulus is developed for further observations, with a more thorough understanding of the morphogeny of the various forms which the infection may take.

THE OPERATION. Since 1826, when Spencer Wells performed successfully the first operation in the case of tuberculous peritonitis with sacculated exudation, under mistaken diagnosis of an ovarian cyst, a number of other cases have been operated upon with beneficial results.

Of the cases collected from the literature, the average percentage of recoveries, with the disappearance of all symptoms and objective local signs following surgical interference in tuberculous peritonitis, is over 60 per cent. In some instances the percentage reached 90 per cent. While the mortality given by König in 131 operations was only 3 per cent., Czerny, on the other hand, had only 2 cases out of 10 to live over three months following operative procedure.

SURGICAL TECHNIQUE. Regarding the surgical technique, there is but slight variance in methods. Czerny, König, and others advise a not too small an incision, the thorough evacuation of fluid, with the removal of the primary foci and all tuberculous masses as far as possible.

Treves shows from an examination of 300 cases that the best results are obtained when the peritoneal cavity was neither flushed out nor drainage employed. He advises strongly against injury to the peritoneum by reckless flushing and sponging, it being better, in his opinion, to allow some of the effusion to remain than to injure the membrane by removal.

Others advocate a free, complete evacuation of all fluid from and an irrigation of the peritoneal cavity afterward with normal salt solution.

Sterilized air has been forced into the cavity through a cannula, but no statistics support the advantage of this affort.

The employment of strong antiseptic solution is now generally condemned.

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DRAINAGE. Drainage should be avoided unless made absolutely necessary by some existing complication, such as a deep, sacculated area; old, caseous, broken-down masses, or injuries to wall of intestine.

Besides, the drain adds an additional tax to an already greatly impoverished intestinal wall—a fecal fistula frequently ensuing from pressure. Both these fistulæ and the drain track proper are most difficult to close at times.

Regarding the cases for or at least most suitable for an operation, it may be said clinically that in all cases of tuberculous peritonitis an abdominal incision is indicated, provided the patient's general condition and strength will stand it. Even where there is more or less involvement of the lungs and pleuræ, the removal of the peritoneal involvement may bring about a general improvement, which will greatly aid in overcoming the lesion in the other organs.

The cases responding most readily to an operation are those in which there is a fluid exudate, especially when encysted or when there is an active primary focus going on within the cavity.

The operation is contraindicated, on the other hand, in those cases of tuberculous peritonitis whenever there is an advanced tuberculosis of the liver, lung, kidneys, intestines, glands, or when the exudate within the peritoneal cavity is solid.

Finally, what the actual changes in this infection of the peritoneum are, or what reaction is brought about in the local lesions and the peritoneum itself, by means of the abdominal incision, remains problematic.

Whether it is the mechanical action produced by air and sunlight, an increase of the peritoneal resistance, or whether after the operation a local reaction in the periphery of the tuberculous nodules takes place, or an increased phagocytosis brings about absorption of the tuberculous products with a formation of new connective tissue, as has been shown in experiments on certain animals, still remains unsettled.

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Through this process it is claimed that the local reaction is hereby induced and the absorptive power of the peritoneum increased.

DISCUSSION.

Dr. Henry T. Byford, of Chicago, Ill.—I would like to bring out one phase of this subject a little more prominently, namely, the evacuation of the fluid in cases of encysted tuberculous peritonitis. I do not think it is appreciated, that a large number of cases reported prematurely as cured die after a reasonable period after evacuation. It is not often taken into consideration how many patients get well without any operation. When evacuation of the fluid in these cases was first employed, it was considered necessary to make a large incision, let air into the abdominal cavity, stir things around considerably, use drainage and maintain it for days, or as long as a large amount of surface could be drained. Now it is not considered necessary to make such a large incision, drainage is not used as much as formerly, and very little is done except evacuation of the fluid. All sorts of explanations are given for the improvement or cure in these cases, and we do not know what is the real explanation. We have obtained the result with very little cause, and the question arises whether such a result could come from such a cause. Is it not possible that the thing we give as a cause of the improvement is of minor importance? I have found that by proper treatment to produce absorption many of these patients will get well. I have also observed that other cases would get well by simply instituting vaginal drainage. It occurs to me that when we make an abdominal incision all we do is to simply evacuate the fluid and get rid of the mechanical embarrassment, and that the subsequent treatment has a great deal to do toward effecting a cure. The patient is put to bed; is dieted for a short time; the bowels are kept well evacuated; the woman learns how to take care of herself, and, knowing that she is tuberculous, adopts the proper treatment.

Dr. Charles H. Mayo, of Rochester, Minn.—I have been very much interested, as no doubt you all have, in the excellent paper presented by Dr. Stokes. It is a subject with which we have had a good deal of experience. We have operated 175 times for tuberculous peritonitis or for peritonitis in which the peritoneum was involved by the tuberculous process. About nearly 100 of these were known as ordinary tuberculous peritonitis, diagnosed as such—the ascitic, serous cases. One of the types Dr. Stokes referred to—the suppurative variety—is very uncommon.

There are a few points we have noticed in this work, and,

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first, they do not occur before puberty, and they do not occur after the menopause. The disease occurs during the child-bearing age of women, and that about four women to one man come complaining of tuberculous peritonitis. Years ago we followed the usual teaching of opening the peritoneum, finding tuberculous peritonitis, evacuating the fluid, permitting air to enter the peritoneal cavity, and drying the fluid. We went through successively those processes. Next came the larger and freer incisions, and the pouring in of iodoform emulsion after drying the fluid. Then came the handling of the intestines, packing off with gauze, and thorough drying of the abdomen. We had to operate on some of these patients several times; they would refill. We would again open them and go through exactly the same process, but we could tell in these cases that there was a difference; that in the succeeding operations there were adhesions, and more fibrin had been thrown out. The intestines began to mat together; the fluid was more gluey in consistency and thicker; finally, the pelvic part would become walled in and hard to get at, and the case would become a cured one. We have followed some of our cases for four or five years in order to see whether tuberculosis of the lungs developed. Some of our patients would come back, as has been pointed out by Dr. Stokes, at the end of six months, a year, or two years afterward, when another operation would be required for the purpose of removing the tubes, or possibly the uterus would be involved. We would see some of those cases during the active stage of uterine life, when the mucous membrane would be thrown off every month, yet they did not have tuberculosis of the uterus during that period, so far as we could determine Tuberculosis of the uterus is not seen, only very rarely, between the ages of fourteen and fifty years.

As to the analogy between the ovary and testicle, neither of them is very often involved by tuberculosis unless by necrotic invasion. The tube and vas deferens, with the character of their mucous membrane, are the structures early involved. In all of our cases we had four in which the tuberculous process seemed to involve the upper abdomen, and they were in people between fifty and sixty years of age. There were three women and one man. While there was a matting together of the tissues around the stomach, the duodenum, with deposits and adhesions, we did not separate those adhesions sufficiently to exactly locate the origin of the disease. We presumed that there was a perforating tuberculous ulcer. As I have said, there were only four of those cases. As Dr. Byford has said, it is the opening of the abdomen and letting air and sunlight in or the use of some irritant that brings about this change. We do not know exactly how the improvement or cure was brought about. We could hardly explain it in the earlier days by the development of fibrin-

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ous peritonitis. We know that the process was walled in, and that some of those patients were temporarily cured, others permanently cured; so that the late Dr. Fenger went into this subject very thoroughly and practically said to his professional friends that it was time to call a halt on operating for tuberculous peritonitis, because an equal number of cases under good hygienic treatment would recover as well as those that were operated upon. He said we could not show an increased permanency of cure. Now, what did we find out finally? In treating these patients and following them carefully, reoperating on some of them, we found that tuberculous peritonitis is not a primary but a secondary process; that when you open the peritoneum and allow fluid to escape, it would be followed by great improvement. In examining these cases carefully, one would find miliary deposits on the peritoneum. The peritoneum would be thickly studded, crowded together, with miliary tubercles. The farther away we get from the original focus they become more discrete, spread out, and, if you go far enough, you will find none. In certain regions you will find a great number of these tubercles.

Dr. Murphy pointed out that tuberculosis of the tube does not close the fimbriated end; that this end of the tuberculous tube is always open unless there is a mixed infection. When you find an ascitic condition, with salpingitis, and an open fimbriated end, you may rest assured that it is a tuberculous tube, and that you will find a similar condition on the other side.

When tuberculosis involves the mucous membrane as a lupus, it is a very difficult thing to cure. The mucous membrane is hard to influence by sclerotic changes; so that the tuberculous process keeps up indefinitely until we have destruction of the mucous membrane. When a man consults you in whose case you can make a diagnosis of tuberculous peritonitis, an exploratory abdominal incision should be made and his appendix examined. In women, on the other hand, an incision should be made to explore the appendix, the appendages, and pelvis, because in them you will find three times out of four the tubes involved. In a case in which the tube is not sealed up and floating in the cavity, with increased distention of the peritoneum and ascites, there will be elevation of temperature. There may be successive leakage from the open fimbriated end of that tube. Tuberculous material will be thrown out; there will be such an irritation of the tube that it cannot close. Whenever tuberculosis centres about the mucous membrane, it is practically impossible to cure it. How does nature effect a cure in these cases? She walls in the tube, holds it down, so that if there is any fluid there it is only adjacent to the tube itself.

Frequently it is only possible to find the tube in some of these cases by following the round ligament to the horn of the uterus

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and shelling out of it the caseating debris. It is not often necessary to remove the fibrous structure, but simply to shell out the caseating deposits and mucous membrane in the tube. In every case in which the pelvis is involved, if you can get rid of the mucous-membrane lesion, you can usually effect a cure, not only primarily, but permanently.

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TRACHEOTOMY FOR GUNSHOT WOUNDS OF THE TRACHEA.

By J. McFadden Gaston, M.D.,
Atlanta, Ga.

In discussing the subject of gunshot wounds of the trachea, we are aware that we have to deal with a wide range of injuries, with the complications that may occur from septic infection or laryngeal stenosis. This class of cases is a very considerable source of death. Even in small wounds a laryngeal stenosis or defective voice, if not a fistula, may occasion trouble. As treatment needs to be prompt and well directed to the case, the prognosis is often serious when a gunshot wound occurs. As to the secondary diseases following tracheotomy, secondary hemorrhages have been known to take place during and after treatment. Erosion of the innominate artery from pressure of the tracheal tube has been attributed to low tracheotomy or suppuration by Körte, Guädisher, Maas, and others. Fatal secondary hemorrhages have originated in the lungs.

In the final process of repair we find granulations which, by their presence and position, occasion trouble. They may be in the tracheal wound itself or in the margins of the trachea, where the tube has abraded a sufficient amount of mucous membrane to stimulate their growth. This may occur where the curve of the tube presses upon the posterior wall of the trachea, and in cases of phonation tubes which contain an aperture. The margins of this aperture should be very smooth or they will occasion this trouble. A valve-

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like enclosure of the trachea by granulations has frequently given rise to asphyxia, when the tube was needed to prevent imminent death. A sharp spoon or the galvanocautery may be applied to such granulations and their destruction accomplished, when it is not thought best to remove them by a pair of scissors with forceps. In such cases a continual source of inconvenience is blood, which has been known to cause instant death when inhaled into the lungs. Although in cases of diphtheria the tube is often removed in a few days, and the wound from tracheotomy heals kindly, there is cause for greater delay for prudence sake in gunshot wounds where stenosis has occurred from œdematous laryngitis.

N. T., female, aged eight years, with a history of good health, except a few of the diseases of childhood, was shot through the neck and right shoulder July 3, 1904. The wound of entrance and of the exit of the ball from a 38-calibre pistol was in a line with the larynx, while the wound in the shoulder was in the line of the acromion process, and the exit ranged somewhat backward of the scapula. In the course of the bullet a shot of this kind would probably traverse the trachea and the soft parts of the neck, and also the shoulder-joint, involving the capsule.

Her condition was quite serious, due to hemorrhages and obstruction of the larynx from œdema. The wounds were dressed by Dr. J. N. Brawner, who saw her soon after the wound was received. A swab of bichloride gauze was used to disinfect the tract of the bullet. The family physician, Dr. J. W. Carmichael, was also called and assumed charge of the case. The disease known as œdema of the glottis was supervening when I was called in, July 4th, with the request to be prepared to do tracheotomy.

In many respects this case is unique, and needs no apology for claiming the valuable time of this Association. S. D. Gross has called tracheotomy the dread of surgeons, and explained to us that while laryngotomy is easy and safe,

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tracheotomy is far from being so. He has also warned the student of surgery against the cases of children where the neck is short and fat. While surgeons are familiar with the anatomy of the neck and with the technique of tracheotomy in the cases of obstruction from foreign bodies, and from the tumors of the larynx and inflammatory products of diphtheria, it is rare for a gunshot wound to occasion this operation. Such wounds in children are particularly uncommon, and in little girls almost unheard of, from the fact that they are usually protected therefrom.

The object of the man who shot this little girl was to convince some tramps that he was prepared to shoot. The tramps were in a coal car and had already given trouble on the way to the city. The circumstances are such that a surgeon should consider, as they gave rise to a damage suit for twenty thousand dollars against the railroad company and the imprisonment of the man. In this case the little girl was standing up on a gate in her parents' back yard to see the approaching freight train come by in a cut in the road below, when she was shot in the manner described. The flagman or conductor of the freight train was standing on the top of a box car and discharged a pistol shot, which took effect in this little girl's neck. His connection with the case was that of an agent of the road in the discharge of his duty.

The symptoms presented were dyspnœa and distress, and a decision upon operation was based upon the necessity for drainage and an open wound, although no rise in temperature or chill betokened a septic infection.

In this case the physicians in attendance, Drs. J. W. Carmichael, J. N. Brawner, H. M. Clarke, and myself, met at the home of the child, at Howell Station, a few miles from Atlanta, to perform the operation. Our idea was to incise as for tracheotomy and judge of the necessity for an incision into the windpipe from the character of the wound in it. A thorough preparation of the field of operation was first made,

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and a considerable time before the operation a hypodermic of $\frac{1}{16}$ grain of morphine and $\frac{1}{600}$ grain of atropine sulphate was injected. Chloroform was administered by Dr. Carmichael. The patient being in a position of extreme extension of the neck, and the head hanging over the edge of a table, enabled the operator to make an incision in the middle of the anterior portion of the neck. The wound was sponged with adrenalin chloride solution, with a normal saline solution, and was comparatively free from blood.

The necessity for haste in the steps of the operation became apparent when the region of the trachea was reached, and probably some blood may have entered the gunshot wound in the windpipe. A violent asphyxia left no room for doubt and no time for indecision, and the string that had been tied in the muscles was lifted so as to expose the glistening white trachea, which seemed to be about the calibre of a lead-pencil. A thrust of the knife and a tube following its opening in the trachea were the steps of the operation done in the emergency. The time taken was less than for describing this part. The seizure of the patient by the feet and the suspension of the body of the child led to a resuscitation. The patient was allowed to regain consciousness and to breathe before the completion of the dressing. No sutures were placed in the trachea, and only a silk suture in the myohyoid muscles served to keep the patient's trachea in position of ready access in case of danger to her by suffocation, should the tube be disturbed or dislodged in coughing.

The position of the incision into the trachea was lateral rather than on the anterior surface of the windpipe. The condition of deflection from the normal position of the trachea made it extremely difficult to reach, so that more than one attempt was necessary in order to reach the trachea. In a child the trachea is quite deeply situated. An extra gush of blood is apt to occur, especially when the blood-vessels are already congested. The child was very weak

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and yet regained her strength sufficiently to be able to leave her bed in her efforts to be more comfortable.

A trained nurse, Miss Alva Garner, was detailed from the Tabernacle Infirmary, and had constant oversight over this patient for nearly four months. She learned to take out the inner tube, cleanse and replace it, and to manage the child in a gentle but firm manner.

The child's temperature was as high as 103° when she was suffering with the bronchitis incident to the injury to the trachea.

After the operation a prescription adapted to the bronchorrhœa was as follows: "Camphorated tincture of opium, 1 drachm; carbonate of ammonia, 1 drachm; oil of turpentine, 1 drachm; camphor-water, 2 ounces; mucilage of acacia, sufficient for 6 ounces. M. Sig.—Take a teaspoonful every three hours."

Her respiration at 8 P.M. on July 4th, the day of the operation, was 30; pulse, 130; temperature, 102°. She was breathing quietly and was able to drink a small amount of water without nausea. She was breathing quietly and slept short naps later when I visited her. I was importuned to let her have some water, which, being drunk, was returned clear by the stomach. As she became quite restless in the midnight hour, she was given ten drops of paregoric with good effect, perspiring and resting well after 1.30 A.M.

The usual medicines which avail for bronchitis were kept up. Antiseptic dressings were used, while the nurse was given instruction as to the manner of removing the inner tube in order to cleanse it of mucus, which, being of a doughy consistence, often obstructed the lumen of the tube. On one occasion particularly it became necessary to do this, and frequently afterward, as the obstruction to air was complete, and the nurse reported the viscid condition of the mucus to be such that a stick was inserted in the tube before a dislodgement was effected. The patient responded well to the treatment. On the 9th of July, only five days

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after the operation, she was considered on safe ground. A photograph was taken on the tenth day, when she was able to be out on the porch. The weather was warm and dry, greatly facilitating her respiration through the tube. About a month after the large photograph was taken another likeness of the little patient was secured, and appears as evidence of her continued use of the tube without serious inconvenience. There were spasmodic coughs when the inner tube was removed, generally relieved by a little water. The mucus was examined by Dr. Ephraim Smith on August 22, 1904, and no pathogenic bacteria were found microscopically. The tube was removed three times daily for thorough sterilization. The nurse was allowed to leave the patient for some hours, and no ill results were feared. On the whole, the patient continued cheerful and happy. Her condition of health was improved with tonics, and in order to secure a closure of the opening made by the operation before cold weather set in, it was thought best to remove the tube. On September 19th we had intended to test the matter of her ability to breathe by the ordinary channel, and if the air passages seemed to permit, to have her dispense with the tube, and we secured the services of another trained nurse in the absence of the one who had been so satisfactory, but had been obliged to return to the Tabernacle Infirmary. Dr. Carmichael gave the anæsthetic, pure chloroform, and the patient breathed very well with the swab applied to the mouth of the tracheotomy tube.

During the application of anæsthetic in this way it was necessary to remove the tube when the breathing was not so satisfactory, and the only explanation of a violent cough was that adhesions may have been somewhat broken up and a drop of blood allowed to enter the trachea. Her violent efforts to remove this blood were effectual and portions of mucus and blood were expelled with force sufficient to reach the glasses worn by me, and to force me to replace the tube, which fortunately allowed the air free access to

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the trachea and respiration was resumed. As this was done so readily, it was obvious that the tube could be removed and replaced without trouble by the nurse. This was due to the adhesions that had taken place between the edges of the wound in the trachea and the external wound. The condition of the parts was very favorable to granulations, which were expected to fill up the opening. In order to test the matter again our patient was placed under chloroform and it was under more favorable circumstances. She was at the Tabernacle Infirmary, where her general condition could be more fully watched; so that at any moment the tube could be replaced by a nurse. The result showed this to be unnecessary, but at the same time the indications were that it would be needed, and it was kept by the bedside in a saline solution.

On September 22, 1904, the tube was removed, and the patient breathed without great difficulty even through the wounds. When the edges of the wound were held together loosely by the fingers, her breathing was shown to be through the natural channels. She had been thoroughly anæsthetized in order to have no excitement, and the ordinary natural breathing would be possible.

With a child habit is a second nature indeed, and with this child breathing through the tube nearly three months was fast becoming her mode of breathing. Reasoning that any interference with this would occasion some involuntary struggle, we sought to remove all the reflexes.

Her power to resume her normal mode of respiration was assured when a piece of gauze was arranged in the form of a cone, and she was allowed to breathe with the external wound closed in this manner, holding it in position at first and afterward using adhesive strips to retain the gauze. The gauze was carried to the edge of the tracheal wound, and fixed there. Then the whole neck was encircled with gauze bandages. When the girl awaked she was with her nurse, but cried and sobbed audibly, as she had not been

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able to do before. Her recovery afterward was uneventful; no disturbance of the inner gauze plug was permitted until she was in a better position to breathe with no interference from without the trachea.

As soon as the tracheal wound itself could be closed, she would be on safe ground from this source. Granulations from the bottom so crowded the orifice in which the gauze cone was situated that she was allowed a short respite from dressings to have perfect rest to the tissues. Permanganate of potash solution, 1:1000, was applied externally before anything was done to the internal wound. No medicines save those she had been taking were required. She gave no trouble to the nurses except when a dressing was needed. Her health was such that she walked about the Infirmary and assisted the nurses. Her voice regained all of its childish tones, and she left the Infirmary October 26th, less than a month after she entered, with perfect cicatrix and no fistula.

I wish to draw special attention to the position of the incision, as it differs materially from any tracheotomy I have seen described, and I believe is an improvement so far as the use of a tube. As has been said, the tube frequently presses with a great deal of force upon the posterior walls of the trachea, and at times this pressure has also extended to the anterior walls of the œsophagus, thus interfering seriously with the deglutition. In this respect no pressure was made which could have inconvenienced the patient, as she could swallow both liquids and solids.

I have consulted the standard authors upon surgery and the transactions of many of the associations, but do not find any operation of a similar character, while I do find there have been cases of difficulty in swallowing, especially liquids, in many cases after tracheotomy. Having incised the trachea laterally and inserted an ordinary tube, no serious inconvenience followed, and it is reasonable to suppose that the lateral incision would afford advantages over the median

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incision. I should like to hear a discussion of this new method, as I consider it of great importance. It is evident that a tube inserted into the trachea may be an irritant, and when it is necessary to remain three months or even years, as the case may be, every precaution should be exercised to secure as favorable conditions for the tube as can be obtained.

On one occasion this little girl fell and the tube was pressed inward so as to cause some hemorrhage. This fall might have resulted very differently if the tube had been in a median line, for the end would have penetrated the tissues surrounding the cervical vertebræ. As it was, the end simply turned with the lateral part of the trachea and any danger from that source was avoided.

It is a remarkable fact that reports of these cases of gunshot wounds of the trachea have not been published in the ordinary text-books upon surgery, and that only one author, Dr. John B. Roberts, in modern surgery, calls special attention to the advisability of tracheotomy in wounds. I am speaking of my own reading, but it is possible that I have not found the literature upon this subject. "Emphysema of the neck may supervene after such wounds by reason of air escaping into the subcutaneous tissue" (Roberts). This I found to be the case already after twenty-four hours, and before the operation the emphysema had extended over the whole face and chest. I was told by the physician in attendance first that air could be plainly noticed going in and out of the trachea through the wound on each side made by the bullet. This establishes beyond all doubt the fact that the trachea had been wounded by the bullet.

Another point of interest in regard to this case was that she was able to talk a little even without closing the orifice of the tube as long as the inner tube was in position, but when the tube was removed she did not speak except by putting her finger in the orifice. Having occurred in the summer time, no great precautions were used, but she was

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not allowed to go out of the house for several days after the operation, and never to leave after nightfall. A fire was used in rainy weather while the air was irritating. She had attention given to the state of the trachea and the bronchial tube and lungs by means of appropriate medicines. The most impressive feature of the case was her own fortitude and willingness to co-operate in what was necessary for her, and when the tube was finally removed no one was better pleased than the little patient, who handed me the box containing the tube some days afterward and said she would not need that any more.

The present condition of the girl is very satisfactory; the cicatrix is slight and will eventually assume the appearance of a dimple in the neck, being so near the sternoclavicular articulation. There has been a great improvement in her voice also: and while there may be a slight contraction of the trachea at the seat of the gunshot wound, this will not give immediate cause for apprehension, and should she have diphtheria or laryngitis some difficulty of respiration will be likely to ensue. I would advise anyone who should have to treat a similar case to use a tube as has been done in this case, and not leave the wound open as has been done in cases of foreign bodies.

DISCUSSION.

Dr. James A. Goggans, of Alexander City, Ala.—This is a subject in which we should all be interested, because any one of us is liable to be called upon to do a tracheotomy or laryngotomy for a wound or wounds anywhere along the respiratory tract. I would, therefore, call attention to their importance, and to the fact that a wound through the floor of the mouth may call for quite a formidable operation. I have seen a case that almost necessitated opening the larynx on account of producing an œdema of the glottis, and any wound above the larynx along the respiratory tract up to the mouth, having in view the possibility of œdema of the glottis, would necessitate the same operation possibly.

Dr. Gaston (closing).—I have enquired of several surgeons, knowing that our time was rather limited for discussion, and

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they would not be here, as to their experience, and I would like to mention it for the purpose of having it reported in the literature and in the TRANSACTIONS. I find, in the experience of such men as Drs. Richardson, Mayo, Murphy, and others, that they have seen no such case as I have reported. They told me that such cases are very rare. They are interesting, worthy of attention, and these gentlemen corroborate fully the steps taken in the performance of this operation. I regard it as a very important case, one of the most important, perhaps, that may befall the average general practitioner, often requiring immediate attention, and that this case, occurring in this way, and having lasted twenty-four hours, was an exception. Usually a case does not go that far.

In Decatur, Ga., Dr. J. H. Green was called to a man who, in a suicidal attempt, inflicted a wound similar to that in my case, and Dr. Nicolson reached him in time to insert a tracheotomy tube; but he died in about twenty-four hours from the effects of hemorrhage. There was also a case of gunshot wound of the gullet, reported by Dr. Griffin, as having occurred in a man during the Spanish-American War, where there was a tracheotomy tube inserted, but the tube was not taken out. It was necessary for the man to wear it all the time.

I have been very anxious to collect statistics on this subject. I was glad to hear Dr. Goggans refer to the necessity sometimes in a wound through the mouth of relieving obstruction in œdema of the glottis. These cases of tracheotomy do not necessarily always come within the range of the specialist. I think they belong to the general surgeon, and it is well for the general practitioner to bear such cases in mind, because he is sometimes confronted with the most difficult cases.

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STYPTICIN IN UTERINE BLEEDING.

By H. J. Boldt, M.D.,
New York.

Having made use of hydrochlorate of cotarnine, or stypticin, the name applied to it by its discoverer, Prof. Martin Freund, of Frankfort-on-the-Main, for the past seven years to control bleeding from the uterus, I feel that my opinion of its therapeutic value has been established with exactness. Having now passed the experimental stage in the employment of the remedy, I am able to supplement my former report on the same subject, published in the *Medical News*, April 8, 1899, with the present contribution.

The drug is a fractionation product by oxidation of narcotine, an alkaloid obtained from opium. Stypticin is a microcrystalline yellow powder, soluble in water. It has an intensely bitter taste. Narcotine, under the influence of oxidizing agents, can be separated into an acid, "opianic acid," and a base, "cotarnine." It can then readily be converted into the hydrochlorate of cotarnine. Chemically it differs from hydrastinine only in the substitution of the methoxyl group OCH_3 for one atom of displaced hydrogen.

The following is a *résumé* of the conclusions concerning its physiological action, the experiments having been conducted in the Pharmacological Institute, of Berlin, by Edmund Falk (*Therapeutische Monatsschrift*, vol. ix., No. 12):

"1. In cold-blooded and warm-blooded animals it produces paralysis by its action on the motor sphere of the spinal cord.

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In the warm-blooded animals a complete paralysis occurs late, usually only shortly before death.

"2. A mild narcotic state, but neither sleep nor complete narcosis, is produced in warm-blooded animals by its action on the cerebrum.

"3. In rabbits and dogs, by both internal and subcutaneous administration, it is productive of intestinal paralysis and fecal evacuations.

"4. It has no direct primary influence in the warm-blooded animals on the heart, circulatory system, or blood pressure. The effects on the heart, pulse, and blood pressure are of secondary nature, through the influence of cotarnine on respiration; only in very large doses, and with long-continued artificial respiration, is a weakened heart action produced.

"5. Its action on the respiratory centre after transitory irritation is paralytic; respiration is, therefore, increased at first, but subsequently rapidly sinks to a quietus.

"6. Fatal termination is produced by paralysis of the respiratory centre, but can at any time be kept in abeyance by artificial respiration."

There is a similarity in the therapeutic action between stypticin and hydrastinine, which is explained by Rousse and Walton on the theory that both drugs augment cardiac activity, and possess oxytocic properties. According to these observers, the difference between hydrastinine and stypticin is that the former causes circulatory modifications more rapidly, acting on the heart and abdominal vessels at the same time while the action of stypticin seems limited to the heart and is slower.

They also find that stypticin slows the action of the heart in the frog and rabbit, whereas it exerts an accelerating influence in the dog; hence they utilized the latter animal in their later experiments. They find, contrary to the opinion of Falk and Marfori, that stypticin exerts a tonic action on the circulatory system. Comparing it again with hydrastinine, they find this acts as a stimulant on the heart, like camphor

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and ether, whereas stypticin can be compared, in its action on the heart, to digitalis; hence the difference in their indication when these drugs are to be used in the control of hemorrhage. All observers agree that stypticin causes fatal termination by its paralyzing effect on the respiratory centre.

The credit of making the first clinical observations belongs to Sigismund Gottschalk, of Berlin. Since then numerous clinicians in Europe have made careful observations and uniformly report most excellent results, not only in bleeding from the female genitalia, but also in instances of pulmonary bleeding and dental hemorrhage, likewise in hæmaturia and intestinal bleeding.

The class of patients for which it was used by me were: 35 cases of fibromyomata; 11 were more or less benefited by its administration and 24 were not benefited at all. Its uselessness was most marked in instances of submucous tumors. I quote one example in which relief was very marked: Mrs. R. S., aged forty years. An interstitial fibroid extending four inches above the symphysis. Menstruation regular, but very profuse, and from eight to ten days' duration. One week before the expected flow 1 grain was administered three times daily; with the onset of the flow the dose was increased to 2½ grains every three hours. The flow has been diminished to three days and is of only moderate quantity. This patient is still under observation. She has positively declined surgical intervention. (If the drug is not taken during a flow, the bleeding is more profuse.)

There were 9 patients with hemorrhage due to cancer of the uterus. The result was negative in each instance.

Postpuerperal Bleeding after Removal of Retained Placenta Particles or Decidua. There were 5 such instances; the patients had had the remnants of conception removed by their family physicians, but still some atypical bleeding persisted. In all these patients complete cure followed in from two to six days. The following is an illustration: Mrs. W., aged twenty-four years, was delivered of her first child six

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weeks before consultation; manual detachment of the placenta was undertaken; three days later her accoucheur curetted her and removed the placental remnants. Some bleeding, however, continued up to the time when I was requested to see her in consultation, with a view of sanctioning another curetting. Not finding any indication that such procedure was necessary, I advised for subcutaneous injection a solution containing 5 grains of stypticin, the injection to be repeated every eight hours until the flow ceased. The bleeding diminished after the first dose and ceased entirely after the sixth injection.

Hyperplastic Endometritis. Out of 13 patients benefit was derived in 3 instances. All were subsequently curetted, but in 8 patients even then the menorrhagia was not markedly diminished. Seven of this number were then cured with stypticin, and 1 was not at all benefited. In the *glandular* form of endometritis the results were entirely negative.

Retroversioflexio with Endometritis. There were 5 instances of this class, but in only 1 patient was the menorrhagia relieved without resorting to surgical intervention, viz: R. T., aged twenty-nine years; two children and one abortion at the second month, nine months before coming under observation. Menstruation during the last three months profuse, and of six to eight days' duration, which weakened the patient very much. The menorrhagia was the only symptom of which the woman complained. Inasmuch as the period always recurred regularly, the administration of stypticin was begun in 1-grain doses two days before the next expected period, and as soon as the flow showed itself 2½ grains were ordered every three hours, this treatment to be continued throughout the period. The first time the flow was shortened to five days, and was of smaller quantity; the second month to four days, and was of moderate quantity, and the third month it was normal and of only three days' duration. The woman did not again report. The

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remaining patients not being markedly benefited were subsequently operated upon.

Chronic Metroendometritis. Out of 9 such patients, 5 were more or less benefited by the administration of the drug, and in 4 the result was negative.

Various Forms of Non-suppurative Pelvic Inflammation, the Uterus itself not being Markedly Affected. Twenty-three patients. The pathological bleeding was subdued in 8 instances; was markedly improved in 9 cases; was somewhat improved in 3, and had a negative result three times. The following narrations may serve as illustrations: M. J., aged twenty-eight years; married eight years; never pregnant. Menstruation regular, of three days' duration, but very painful. Amount of blood lost, small. Her physician dilated the cervix and curetted her four months previously. She was ill three weeks as the result of that interference. On examination the pelvis was found to be filled with an exudate which prevented mobility of the uterus. The parametritis and perimetritis were diagnosed to be non-suppurative. The patient had atypical bleeding of varying intervals, from two to four weeks, and each bleeding was profuse, and from seven to ten days in duration. The remedy was ordered in doses of 1 grain three times daily when not bleeding, and as soon as blood showed itself 2½ grains were ordered to be taken every two to three hours. The effect was marked, the amount of blood lost began to lessen from the beginning, and, after three months of administration in the manner described, menstruation began to be regular, although considerable exudate was still present.

Chronic Tubo-ovarian Inflammation. A. G., aged twenty-seven years; one child three years previous to consultation. During the preceding two years the woman had been bleeding from eight to twelve days, losing a large quantity of blood at each period; prior to this the menstrual period continued but two to three days and the blood lost was moderate in quantity. She was ordered to begin with the drug three

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days before the expected flow in 1-grain doses, and, on the appearance of bleeding, increasing it to 2½ grains every two to three hours according to the severity of the bleeding. The patient had been curetted three times, and it had been proposed to remove her slightly thickened and (as was shown on examination) sensitive Fallopian tubes and somewhat enlarged ovaries, yet four months of treatment with stypticin as described sufficed to rid her of the menorrhagia.

Patients who have slight irregular bleeding during pregnancy are greatly benefited by letting them take stypticin. Usually these patients are much alarmed so long as such bleeding continues, and in my experience it ceases after a few doses of stypticin have been taken. There has been no unfavorable symptom caused by its administration. In all there were 11 such instances.

Profuse Menstruation in Virgins without Detectable Changes being found in Pelvic Organs on Rectoabdominal Examination. There were 17 such patients, and in only 5 the result was entirely negative. In 1 of these hydrastinine gave the desired relief. Five of the patients had dysmenorrhœa as a complication, and in 2 instances this was diminished by the drug. One illustration may suffice. E. L., aged twenty-three years. Menses began at twelve years, the flow being at irregular intervals of from six weeks to two months during the first eighteen months; then the flow was of moderate quantity and of two to three days' duration; painless. From the second year after the beginning of menstruation the flow gradually increased in quantity and duration, and was associated with much pain, so that at the time when the patient came under observation the flow was of from eight to ten days' duration, exceedingly copious, and associated with such severe cramp-like pains that the young woman had to spend from three to four days in bed. Ordered 4 grams stypticin (Merck) divided into 40 capsules, 1 capsule to be given every six hours, beginning three days before expected flow; on the appearance of the flow and

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during it, 1 capsule every two hours; if the flow was not diminished in twenty-four hours, then 2 capsules were to be taken every two hours. In three months this patient had the bleeding decreased to four days' duration and the dysmenorrhœa so much improved that she did not find it necessary to go to bed during the period.

Atypical Bleeding During the Climacteric Period. If there was no pathological cause found for the occurrence of this symptom, the result has usually been satisfactory. It is necessary, however, to give it on the first sign of bleeding.

The remedy has also been used in a few instances of uterine bleeding in patients in whom no cause at all could be found for the occurrence of the hemorrhage, and in these instances, too, the result was fairly satisfactory.

It must, of course, not be expected that stypticin is a panacea for all cases of uterine bleeding, but it has been found to answer better than any other remedy that I have used. If no effect at all is produced after three large doses (from 2½ to 5 grains) have been given, it is useless to continue with the drug. In the cancer cases it was tried as a palliative measure prior to the palliative operation, but, as has been noted, without effect. It is likewise not recommended to continue its use in instances of fibroid if two hypodermic injections of 5 grains each at intervals of four to twelve hours do not cause a diminution of the hemorrhage. One should resort to surgical intervention when necessary. It is intended here merely to call attention to one of the most valuable remedies in the pharmacopœia for the relief of a symptom often met with by physicians; a remedy that may be advantageously tried with patients who decline immediate surgical intervention, or who are not in proper physical condition to risk such intervention. I do not coincide with those of my confrères who look upon gynecology only from a surgical side.

It is reasonable to expect that one is in a position to make practical deductions after having used a therapeutic agent

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as extensively as I have employed stypticin. While I am not as enthusiastic about its general use as a remedy to control uterine bleeding, yet there can be no question about its utility in many properly selected cases. In fact, in some instances it has practically served as a specific. Further—and this is important—no harmful action was observed even when it was administered in such large doses as 5 grains every three hours. Neither was it noticed in the employment of such large doses that it had a hypnotic effect as was maintained by Gottschalk, who attributed this action to stypticin because it is a derivative of opium. The only semblance that I have observed that might be construed into the supposition that stypticin acts like a hypnotic in medicinal doses is, that in some instances it also relieved various patients of pain associated with the profuse bleeding and hence induced a restful condition. That the therapeutic value of stypticin is not due to its possessing oxytocic properties, as has been stated by some writers, is best proved by the fact that in no instance of slight bleeding during pregnancy, in which the drug was administered, were uterine contractions produced, but the bleeding usually ceased. Further, Gaertig, in the lying-in asylum with which he is connected, experimented with the remedy in instances of premature labor and in atony of the uterus without observing any uterine contractions as the result of its administration.

It has been found that in instances of too profuse menstruation the best plan is to begin with 1-grain doses three times daily about one week before the expected flow, and, as soon as the flow begins, to let the patient take 2½ grains every three hours, to be continued during the entire period. In instances of metrorrhagia from 2½ to 5 grains may be given at intervals of from two to three hours until the bleeding is lessened; then the dose may be decreased to from 1 to 2½ grains at intervals of three to four hours. If a quick result is important, it is best to give 3 to 5 grains in a 10 per

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cent. solution subcutaneously into the buttock, using the customary antiseptic precautions. The small doses recommended by our German confrères did not give me a sufficiently satisfactory result often. Because of the disagreeable taste of stypticin, it is best administered in the form of capsules, ordering the pharmacist to put the powder dry into the capsules. It may, however, also be given in tablet form.

DISCUSSION.

Dr. Joseph Taber Johnson, of Washington, D. C.—I have been looking for such a remedy as Dr. Boldt has described for treating the two classes of cases referred to in his paper, namely, virgins and women at the climacteric. We have just discussed the subject of suspicious bleeding at the climacteric in Dr. Hall's paper on the early diagnosis of cancer; but there are some cases of bleeding connected with the menopause that are not due to cancer, and I have found that women at or about the menopause are less willing to undergo examinations than they were earlier in life, and for that reason, necessary examinations are postponed, if it is a malignant case, until the disease has advanced too far for surgical relief. But if we have a remedy of this kind which we can give to patients with bleeding or simply profuse menstruation at the time of the menopause, it will cover "a long-felt want."

In regard to virgins, I have been put to my wits' end a number of times in attending and prescribing for girls in female schools and seminaries in our part of the country. We should be very careful in making examinations of young girls from sixteen to twenty years of age. We know that in some of these cases with profuse menstruation they are not relieved by ergot, cottonroot, and a number of other agents which we might give, and consequently they are sometimes subjected to curettement. If we can relieve them by the use of such an agent as stypticin, it is an advance in our therapeutic art. I am very glad to have heard the paper.

Dr. Daniel H. Craig, of Boston, Mass.—I think the use of stypticin at the time of the climacteric by Dr. Boldt, by Dr. Johnson, or probably by any member of this Association, would be perfectly safe. But, on the other hand, I think it is appropriate to offer a distinct protest against advising the use of such an agent by the general practitioner, who places a great deal of credence in what is said in papers and discussions emanating from this Association. The general practitioner is always glad to have the slightest excuse for avoiding a pelvic

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examination in a woman at the time of the menopause, and it seems to me, if we put such a drug as this in the hands of the general practitioner, with the results which Dr. Boldt claims to have had in some cases, we shall be putting a premium on his delaying these examinations, when an examination in time would reveal the presence of a condition in which stypticin or any other drug must fail; I mean malignancy. We should not advocate the use of any drug at the time of the menopause for suspicious hemorrhage, until we are sure by every possible means that this atypical hemorrhage is not due to carcinomatous degeneration.

Dr. J. Shelton Horsley, of Richmond, Va.—I would like to ask Dr. Boldt, when he closes the discussion, if he has ever had any experience with the use of extract of mammary gland? I have had occasion to use it in a few cases, and in one case, when a patient was anxious to be operated upon, it had a happy effect in apparently checking profuse menstruation.

Dr. A. Palmer Dudley, of New York City.—I cannot help taking part just a little in this discussion, and I want to agree to a certain extent with remarks that were made by Dr. Craig, who stated that we should never prescribe stypticin until we have examined a woman, and I do not believe that Dr. Boldt would use this agent until he has examined his patient. We are not quite magicians, but I tell you we are getting to it pretty fast.

I want to say a word in behalf of this drug, as it was through Dr. Boldt that I first used it. I have been using it for the last five years or more with most beneficial effects in selected cases, bearing in mind that there is no one thing that is a panacea in either surgery or medicine, but certainly this drug does act like a charm in many cases. The physician is called upon to use his judgment with this as with every other drug, and when he has selected his case and applied the remedy, it will not fail him, unless he is using a drug that is an imitation.

I draw the line rather sharply with my dear friend, Dr. Johnson. I do not believe that the child lives, the woman lives, the girl lives, the old maid lives, or the woman near the menopause lives, that we as specialists and teachers in our special branch should hesitate to examine under proper conditions; so that I hope Dr. Johnson will take back some of his remarks. Schoolgirls? Yes, many of them ought to be examined. It would be better for them if they were. No intelligent gynecologist—and I know we have in Dr. Johnson one of the most intelligent men—would prescribe a drug without first examining his patient to see whether it was applicable to the condition. Now, I say give the benefit of the doubt to the drug, if you do not want to give it to the girl or woman; and when the experience such as Dr. Boldt has given to the Association to-day is looked into by the members of the profession at large, I am sure they will place great confidence in his statement; and who else can a general

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practitioner depend upon than those men who are devoting their lives to one special study? If you give them a loophole, they are going to take the benefit of it and devote it to the treatment of the case. They are going to hesitate to examine a girl; they will hesitate to prescribe an examination, and we should not let them do that if we are going to teach them. I have on many occasions curetted from the uterus of a girl, aged fourteen years, a teaspoonful of fungous growth—intrauterine adenoid, more properly speaking—and why should not they be subject to such things as well as those who are subject to nasopharyngeal adenoids? We find the latter in children. You can find it in a certain number of cases within the uterus of early menstruating girls. Dr. Boldt, therefore, has launched forth a remedy with which he has had considerable experience, and with which I have had experience. I want to be distinctly and thoroughly understood, however, that I do not, will not, and never shall advocate any drug that I am not thoroughly familiar with—never. But I do say, as a man teaching the general practitioner, we should not say to him, "Keep your hands off, but bring that patient to me and let me see whether I need to keep hands off or not." That is our object; otherwise, we should not devote our time to a specialty. Give the benefit of the doubt to the drug instead of to the patient.

Dr. Johnson.—My dear friend, Dr. Dudley, who has been my dear friend for over twenty years, and I hope will be for twenty years more, is a little wrong on this point, and I shall be glad to set him right; and it is from experience in these cases that I want to say a word or two, because I think he has the cart before the horse. It seems to me quite appropriate, after listening to his philosophical reflections, that we should try some of these remedies on school and seminary girls in our cities. The teachers invite us to come and see a girl, perhaps, whose home is in San Francisco, in Alabama, or in Massachusetts. These girls are entrusted to their care, and they want every remedy tried before a girl is subjected to an examination; and it seems to me it is in accordance with one of the highest principles of our profession to keep hands off until we have exhausted the best remedies of the pharmacopœia. I would not let a girl bleed to death or become so exsanguinated as to become a prey to any disease that came along; but in stypticin we have a valuable agent, and we have a right to take time to use this remedy in connection with better management as regards letting-up on their studies, a little more out-door air, and taking the pressure off by diminishing the school curriculum. With such treatment, together with the use of this or some other remedies, we may be able to control these hemorrhages without examination.

I recall one case that impressed this point very seriously on my mind. I examined a young girl, who was attending a promi-

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nent school for young ladies in Washington, at the earnest request of the teacher. The patient was entirely willing. After this examination had been made and the girl went home, the parents were so incensed at this having been done without their consent that they wrote me a severe letter on the subject, and took the girl away from the school, and reprimanded the teachers for permitting any such thing without their knowledge and consent. This is the view that the parents sometimes take, and I think Dr. Dudley will agree with me that, in the cases of girls from fourteen to twenty years, it is right and proper to delay physical examinations, especially where they have an unruptured hymen. In the cases near the menopause, we should be absolutely certain that there is nothing malignant about them before we dally with them.

Dr. Dudley.—I will leave my defence in the hands of Dr. Boldt when he closes the discussion.

Dr. Boldt (closing).—With reference to the question asked by Dr. Horsley, I will say that I have used mammary extract in cases of fibromyomata, and in some of them benefit was noticed, but, as a rule, it was slight.

So far as Dr. Craig's protest is concerned, I will say that I distinctly stated in my paper that in cases of climacteric bleeding, with no detectable pathological condition to account for it, I would not undertake to express such an opinion unless I had made a thorough examination. I examined the patients carefully before reaching a conclusion.

So far as virgins are concerned, I also stated that I used the remedy in a certain number of them—some thirty-odd cases—after careful and repeated rectoabdominal palpation, when no cause for the menorrhagia could be found. If I find a virgin of twenty or twenty-three years of age having a hemorrhage, and, after examination, I discover a tumor present, or a serious lesion in the pelvis, I am not going to waste my time in giving any medicinal agent, but give simply a plain statement of the facts, and advise what to do in such a case. Everybody can try this agent for himself; but I wish to say that in a certain class of patients in whom we have menorrhagia or metrorrhagia, this remedy has answered a better purpose than any other I have so far used.

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SOME POINTS IN THE TECHNIQUE OF ASEPTIC OPERATING.

By Henry T. Byford, M.D.,
Chicago.

The principles of antisepsis are well understood by the profession, and the methods employed to avoid septic infection are fairly uniform. But since infection not infrequently occurs as the result of an imperfection in our antiseptic detail, it is well for us to occasionally discuss the subject and criticise our methods, that we may reject the bad and adopt the good.

The most important point in the prevention of operative infection is, of course, to keep our hands out of septic matter for a considerable period of time before operating, for it is a physical impossibility to remove all infective material from the deeper layers of the cuticle.

If by looking through a strong lens we magnify the skin of the hand to the extent that the epithelial scales assume the size of the ordinary fish scales, and magnify also the bristles of the nail brush in proportion, it will not seem unreasonable to compare the scrubbing of our hands and fingers to the scrubbing of ten fishes with a brush whose bristles are much larger in diameter than the fish scales, or about as large as a thumb.

But on the human skin the scales grow in more layers than on the fish, and are situated on rugæ and papillæ and in folds and sulci. Besides, the human skin has many hairs with their scaly surfaces and individual follicles, and has also many sweat glands. When we reflect that these hair

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follicles and epithelial tissues are the natural habitat of the staphylococcus albus, we realize that the cleansing and sterilization of many fish skins is child's play compared with the sterilization of our hands. In fact, our hands cannot be made clean and sterile except by removing the cuticle, a procedure which I am not yet prepared to advocate.

The only thing practical and safe is to clean and disinfect the surface as well as possible, and then cover it with a coating that will prevent the deeper, unremoved septic matter or germs from reaching the field of operation. This is why so many use rubber gloves. But gloves do not constitute an ideal coating. They interfere with delicacy of manipulation. They are dangerous because they excite sensible perspiration and thus bring germs from the deeper layers of the cuticle to the surface ready to infect the patient through possible tears and punctures. It is quite common during an operation for a puncture to be made in a glove finger and be overlooked; and even with the greatest care we cannot be certain that some puncture or tear will not be overlooked. It is exceedingly annoying as well as detrimental to be obliged to change a glove two or three times during a difficult and prolonged operation. The coating of the hands with gutta percha or other material of similar nature would seem open to the objection of causing the accumulation of sweat in the glands and a maceration of their orifices. Germs would thus be ready to escape if a scratch or tenaculum puncture should liberate them.

The old way of thoroughly preparing the skin and then applying a germicide that will harden the surface and check perspiration, and that can be renewed from time to time during a long operation, still seems to be very nearly the ideal method of treating a surface that cannot be sterilized except in a most superficial manner.

In cleansing the hands I always keep in mind the fish skin and the comparatively coarse brush that cannot penetrate between the scales nor to the bottom of the folds and sulci.

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Hence I consider that in addition to scrubbing the hands with soapy water a certain amount of soaking is necessary to soften and loosen up the dirt between the epithelial scales and at the bottom of the depressions. Twenty minutes should be, therefore, given to scrubbing and soaking the hands in soapy water. I prefer water drawn into a basin and frequently changed to running water, because a better and soapier soaking is possible.

But even after the most thorough cleansing with green soap some stain or hardened, inorganic matter that may be insoluble in the alkali is apt to remain on the skin, and hence a short scrubbing in diluted acetic, citric, or oxalic acid is desirable. This dissolves the remaining inorganic matter and more thoroughly exposes the underlying cuticle. Two or three minutes of such scrubbing will usually suffice.

In order to penetrate still deeper and to harden the cuticle which has been swelled and loosened by the alkaline scrubbing and soaking, a scrubbing and soaking in 90 per cent. or 95 per cent. alcohol is desirable, if not essential. The harder the cuticle becomes under this process, the more completely are the underlying and unreachable staphylococci covered up and imprisoned in the depths of the cuticle.

The hands would now be sufficiently prepared for a short operation, but they may be more efficiently and more durably rendered safe for a long operation by an additional scrubbing and soaking for five minutes in a 1:2000 aqueous solution of mercuric chloride. This not only quickly destroys germs if it find any, but it still further hardens the cuticle and forms a sort of film of albumin or albuminate of mercury, which imprisons the germs beneath the surface. The film would be softened and perhaps be worked off during a protracted operation, were it not that by dipping the hands and arms in the mercuric chloride solution we can fortify or renew it every ten or fifteen minutes, and practically ensure an aseptic handling of the tissues during the entire operation.

I would deprecate the mixing up the steps of the prepara-

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tion of the hands and arms by using a combination of green soap and alcohol, or by dissolving the mercuric chloride in the alcohol. One substance interferes with the best action of the other, and alcoholic solutions of mercuric chloride have been found to be less efficiently antiseptic than aqueous solutions of the same strength.

With regard to covering the arms with sterile sleeves, I consider the practice a bad one, because the sleeves are more or less loose and folded, and are apt to touch the assistants, the instrument dishes, and parts of the patient beyond the immediate field of the operation, and may then carry dirt or germs into the field of the operation, particularly if the whole hand be introduced into the abdominal cavity. The bare arms of the operator can feel the slightest touch and he can dip or wash them in the bichloride solution at any time. This cannot be done to the sleeves, which may touch surrounding objects many times without the knowledge of the operator.

Many teach that in performing peritoneal section no antiseptic solution should be touched after the peritoneal cavity has been opened, for fear of bringing the irritating fluid in contact with the peritoneum. This is true with the ordinary preparations for operations as I have seen them. In order to do this efficiently and safely as a routine practice the operator should have three basins within easy reach, two filled with warm sterile water and one with a warm 1:2000 mercuric chloride solution. In order that the mercuric chloride shall not harden the blood on the cuticle and interfere with subsequent disinfection, the hands are first dipped in a basin of sterile water to remove the blood, then into the mercuric solution, and then, before the field of operation is touched, into the other basin of sterile water to remove the excess of mercuric chloride. In this way a frequent renewal of asepsis is safe and practical. But as I seldom see more than two basins at the disposal of the operator, and seldom see a laparotomist redisinfect his hands during the per-

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formance of an operation, I infer that this practice is not usually followed.

I wish to bring up one other point that is of the greatest importance, if one would have perfect results in asepsis, viz., the preparation of the field of operation. The soap and water scrubbing just before the operation is often quite thorough, but the scrubbing with alcohol or ether and with the antiseptics is ordinarily quickly and insufficiently done. Now, it is comparatively easy to clean the abdomen, but it is quite difficult to clean the pubes and groins. In the practice of many surgeons who have otherwise good results, suppuration of the stitches after the Alexander operation is almost the rule. The reason for this is that the skin about the proposed incision is not properly prepared. The shaving should be carefully done, in order not to produce scratches and abrasions, and the scrubbing not only with soap, but with alcohol or ether and the mercuric solution, should be thorough and prolonged. In plastic operations upon the genitalia, the perineum, and vagina require the same prolonged, careful scrubbing, and the cervix a thorough wiping out and disinfecting. Vaginal douches, although they be prolonged and strongly antiseptic, are not sufficient.

The smallest operation should have the same thoroughness of preparation as the major ones. Pain or a rise of temperature should never follow a curettage. That pain, temperature, and sometimes serious infection do sometimes follow a curettage is a fact that I have observed in the practice of celebrated surgeons. And I have been particularly impressed by the fact, because my assistant caused great surprise on two or three occasions by telling operators of her acquaintance, who had had trouble after curettage, that we never had either pain or temperature at the Woman's Hospital after curettage. Now this fact reflected no particular credit on the hospital, for it was only what should follow a proper technique, but it proved to me that by haste, thoughtlessness, or perhaps a want of study and intelligent attention

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to detail, operators are still having occasional bad and unjustifiable results. Experience and skill are good, but cleanliness is better, and more careful study should be given to it.

While we are talking about septic skin, I would like to apply the same reasoning to the dressing of the wounds after operations. Since germs exist in the depths of the cuticle and are prone to come to the surface, they must be rendered harmless after they arrive there. This is best done by absorbent dressings that absorb perfectly the discharges as well as the perspiration. Germs require moisture for their development, and perfect dryness is the ideal to be striven after. Occlusive dressings made with collodion favor the development of the native staphylococci in the perspiration and serum and blood exuded about the sutures and retained there. Powders do not absorb well, and form hard masses or cakes over the wound which allow moisture to accumulate under them. The best dressing is sterilized gauze placed in shreds over the sutures so that the shreds will be forced down into the depressions about them, and a thick layer of sterile gauze over the shreds. After abdominal incisions such dressings will keep the wound fresh for about a week. Over the inguinal incision the effect does not always last so long. Alter five or six days the inguinal wound should be washed off with an antiseptic solution, then be thoroughly dried and be again covered with sterile gauze, which may be changed every day or be left on longer, according to the amount of irritation apparent. Dry dressings over peritoneal sutures should be changed every four hours, and oftener if they become saturated.

DISCUSSION.

DR. J. WESLEY BOVEE, of Washington, D. C.—In the main, I agree with Dr. Byford and with the description of his methods of preparation. There are some things, however, in which I disagree with him, and one of them is, I do not believe bare arms and hands are superior to covered arms and hands, for the reason that we cannot thoroughly asepticize the skin. Nothing

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of a septic nature should come in contact with the wound. Our instrument trays and tables should be so protected from anything septic that if any of the assistants touch them with their sleeves they will not carry septic material by means of instruments to the wound. If the arm and hand is thoroughly protected by a sterile sleeve of rubber and a glove, there is not so much likelihood of septic material coming in contact with the wound. We should be cautious in the use of rubber gloves. I know gentlemen doing surgical work who tell me that they never use a pair of gloves for more than one operation, for the reason that the gloves are injured during the operation. Personally, I have done as many as 100 abdominal sections with one pair of gloves. But these gloves must be used with great care. They are fragile, and are easily broken. If they are broken, there is danger of infection from the recesses of the skin. I have my gloves made of the thickest material that can be possibly procured from the manufacturers, and I feel safer with them. Moreover, they are easier to work with; they do not double up and crease over the fingers so much.

As to the use of ether and alcohol, I practise the same method that the essayist does in that respect. I never use ether, but do use alcohol. In closing wounds I do not go through the skin with buried sutures. Perhaps once or twice a year I violate this rule by using silkworm gut where I work in great haste. Many times I have left a wound open rather than put in these sutures. When I have time, I close the wound with tier sutures, and never put in any material that is non-absorbable. The skin is brought closely into apposition. It will unite in a short time, say two or three days; so that we will not get penetration into the wound from the surface. I am careful not to scrub a wound after operation. After the suturing is done, I simply pour salt solution on the wound, then bichloride solution, and put on dry bichloride gauze, covering the wound three-quarters of an inch in every direction. Over this I put a layer of ten or twelve thicknesses of gauze, saturated with collodion, which extends five inches in every direction from the wound. This dressing is allowed to remain for fourteen days, when it is removed. I have no trouble from abscess. This gauze is sufficient to protect the wound from perspiration or from any micro-organisms, if they are present.

Dr. Charles L. Bonifield, of Cincinnati, Ohio.—I want to commend the paper of Dr. Byford and to concur in nearly everything he said. I am a strong advocate of rubber gloves. There are three reasons, I think, why they are particularly valuable. First, they can be boiled; second, they cover up the ends of the fingers, and third, being smooth, they are readily cleansed during an operation. While it is hard to sterilize any portion of the skin, it is practically impossible to sterilize the

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skin under the finger-nails. If rubber gloves did nothing else than to cover up the tips of the fingers during operations, they would be of value.

One of the speakers mentioned the experiments made in Vienna, which proved conclusively that smooth-rubber gloves can be practically sterilized by washing in soap and water. If, during an operation we get our hands soiled, we cannot prolong the operation enough to sterilize them; we must go on with the operation with hands that are not aseptic. If during the operation we get the rubber gloves soiled, by washing them with soap and water in about two minutes we are ready to proceed with the operation.

During an operation I have a nurse stand near me with sterilized water in a glass flask, that it may not be contaminated by someone when I am not looking, ready to pour it over my hands at any time. This I have her do at frequent intervals.

DR. I. S. STONE, of Washington, D. C.—I had used rubber gloves for my own protection before it was thought necessary to employ them for the protection of the patient, as some of my professional friends know that I am susceptible to any slight infection. I think I have made a mistake in scrubbing too much. I used finger-cots for operations when they first came into use.

We might consume the whole time of this afternoon in discussing these papers. This topic is prolific of discussion, and it is certainly not the least important of the discussions we have had. I have rather enjoyed the prevalent tendency which has been manifested almost every day during the meeting of this Association, and while the discussions we have heard have tended toward greater simplicity, we have had more unification of thought and centralization of endeavor at this meeting than I have ever experienced in this or any other Association. I consider this one of the best meetings, if not the best, we have ever had. It is a good thing to have unification in scientific ideas. On the first day of this meeting sentiments were expressed in favor of conservatism, and the next day there was a tendency manifested in the discussions toward a less rigid and vigorous treatment of general peritonitis, and I believe all of those discussions have been exceedingly profitable. I have never appreciated a discussion more than the one that was had on the paper of Dr. Sherrill.

To revert to the little matters of detail which may decide the fate of a patient or otherwise, you will remember in one of my previous discussions I referred to Bantock in relation to cleanliness. I do not think the lessons of cleanliness given by him, and his personal behavior during operations, can ever be forgotten by anybody. But his idea was perfect cleanliness and not chemical antisepsis, and surgeons could perform operations, in his opinion, successfully and with better results than

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with ideal "Listerism." At that time he used silkworm-gut. He did not boil it. Soap and water and their proper use were a part of his religion, as everybody knows. The time came when we began to find out that the use of bichloride of mercury was to some extent disadvantageous in obstetrics. They deserve credit for having pointed out that its use in the vagina was wrong. For that reason I do not think it is wise to use bichloride of mercury over any raw surface. Dr. Bovée mentioned its use in washing abdominal wounds. My contention is that when we have done clean surgical work, the wound needs no washing with antiseptics, but merely cleansing. If there is serum, let it remain on the exposed edges; there is no likelihood of the entrance of germs. Why should we use something which, in many instances, causes necrosis, or some interference with the healing of the little-exposed portions which remain, even with the carefully closed wound?

With regard to the use of these rubber sleeves, I do not object to any man using what he pleases, but I think with bare arms, carefully cleansed, and especially with the gauze sponge, it is not necessary to use a sleeve. We can get the arm sufficiently clean. I do not touch my bare arm to anything above my wrist.

Dr. Charles H. Mayo, of Rochester, Minn.—I have enjoyed the paper of Dr. Byford and the discussion on it. I heartily endorse the remarks made by the last speaker concerning this particular meeting of the Association. It has been a very interesting one to me.

Dr. Byford impresses upon us the fact that there are no known methods for absolutely cleaning the skin. That is very true. The skin has germs in it which seem to have their natural home there, and anything we do to break down the natural resistance of the skin against the germs that are normally located there is liable to produce trouble in the skin itself. By breaking down the resistance we give the germs in the skin a chance to work. In your visits to different hospitals, if you will watch some of the dressers or internes in those hospitals, you will find that some of them will have very smooth skins; in others the skin of the hands will be so rough and eczematous that you would not think of having them dress a wound for you; yet, if you follow up the dressers of that hospital, you will find they redouble their efforts as far as scrubbing and cleaning are concerned. Skins are entirely different in their smoothness. For instance, my brother (Dr. William J. Mayo) cleans his hands and washes them in pure turpentine. I cannot use that at all; it blisters my hands. So that a man in doing surgical work wants to get his hands clean by some method that suits him. There are a dozen different methods of cleaning the skin, and whatever method any man is using which produces rough skin is a wrong one, and

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he should change to some other method until he can accomplish the cleansing of his hands to a satisfactory degree as far as he is concerned, and not use any method of hand disinfection which produces roughness of the skin.

Dr. A. J. Ochsner does not use gloves. His two assistants, however, use them. I have examined Dr. Ochsner's hands and they are almost equal to a rubber glove in smoothness. His hands are as smooth as those of a baby. After working on a pus case and simply washing his hands, he is ready to take hold of clean cases, and he gets as good results as anyone else, even though he may not make as much apparent preliminary preparation.

A smooth-rubber glove can be dipped in pus, and, with good washing in running water, it would only be rare that one could not clean it so as to use it on another case. It seems to me the experimental work that has been done has proven this. Harrington, a short time ago, presented a paper on this subject in which he brought out the point that alcohol of 70 per cent. purity seemed to be more efficacious than pure alcohol. According to his experiments, with bichloride it took so many minutes, and with alcohol so many minutes, to kill germs. He showed that by using a combination of hydrochloric acid, alcohol, and bichloride of mercury one could kill germs in one-half the time he could do so when one of these remedies was used alone; that the same germs would be destroyed in thirty seconds by a combination of these drugs, such as he presented and published recently in a paper in the *Annals of Surgery*.

Dr. E. Denegre Martin, of New Orleans, La.—I have enjoyed the discussion of this paper very much. There is one point I wish to bring out, and that is the danger of the rubber glove. When both the hand and the rubber glove have been properly prepared, there is less danger; only two weeks ago I had an illustration of the danger of rubber gloves. I was operating at one of our institutions and the house surgeon was to assist me in a laparotomy. I kept urging him to get ready, and he said: "I will be ready in a minute or so," and, to my surprise, he pulled up his sleeves, went to the bowl, and washed his hands for about three minutes. He said: "I am wearing rubber gloves and that is sufficient cleaning of the hands." Now, there is danger of these gloves rupturing during an operation, and that is the point I wish to emphasize here. I believe many of our assistants do not fully appreciate the value of thorough asepsis and the thorough preparation of the hands, consequently they are prone to be careless. I use rubber gloves only in my septic cases. The major part of my surgery is done in the Charity Hospital, and I do lots of work for patients who do not pay me a cent, and you may be sure they do not furnish me with rubber gloves. If I had to use rubber gloves when operating on these

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cases, I am sure I would "go broke" in a short time. In my private work I do not use them except in septic cases, but depend upon a thorough scrubbing with soap and water, then washing in bichloride, and using clear water to immerse the hands. After preparing my hands for fifteen or twenty minutes, I feel satisfied that I can expect good results. In the past two years I have had only two cases in which the wounds suppurated.

As long as I feel that I can get good results by cleaning my hands in the manner I have mentioned, I shall keep it up, and I do not think it is fair to teach that we cannot thoroughly asepticize the hands when we can get such favorable results.

Dr. J. Whitridge Williams, of Baltimore, Md.—Unfortunately I did not hear Dr. Byford's paper, but, after listening to the discussion upon it, I feel that I ought to enter a protest against some of the views which have been expressed as illustrating the present tendency toward neglecting proper teaching concerning hand disinfection.

In the first place, I desire to direct attention to the fact that many of the so-called bacteriological researches upon the value of the various methods of hand disinfection are absolutely worthless. Many men have come to believe in methods of hand disinfection which are based upon imperfect bacteriological technique. For example, in many instances the hands after being carefully washed are soaked for a varying period of time in the solution whose value is to be tested, after which cultures seem to prove that the hands are absolutely sterile. Unfortunately, in many of these experiments the investigators fail to take into consideration the fact that they may carry over on their hands an amount of the disinfecting solution which is sufficient to inhibit the growth of the organisms upon the culture medium, without, however, killing them.

This fallacy was impressed upon me at the Johns Hopkins Hospital in the early researches conducted there upon hand disinfection. Thus, if the hands were soaked in a bichloride solution and cultures immediately taken, the results were always negative. If, however, the precaution was taken to precipitate the bichloride remaining upon the hand by means of ammonium sulphide before taking the cultures, the results were always positive; thus showing that in the former case the growth of the bacteria was merely inhibited, and that the hands themselves had not been efficiently sterilized.

Exactly the same applies to alcohol disinfection. Thus, if the hands are carefully washed in soap and water and then soaked in alcohol and cultures immediately taken, the results are always negative. On the other hand, if after removing the hands from the alcohol they are soaked in warm sterile water, the cultures will always be positive. These experiments show clearly to my mind that alcohol is not an efficient hand disin-

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fectant and that its results are merely apparent, in that it temporarily hardens the skin of the hand so that the bacteria which are beneath the surface cannot be readily removed, but as soon as the hand is moistened with water or by the warmth and fluids in the field of operation, the bacteria will readily grow.

Dr. Mayo called our attention to the excellent results obtained by the combination of bichloride, alcohol, and hydrochloric acid, advocated by Harrington. I am, of course, familiar with the method, but have not read Dr. Harrington's report, and I would merely say in this connection that, in order for his report to carry conviction to my mind, it must carefully detail the technique employed in the experiments, and show that the possibility of carrying over either the bichloride, the alcohol, or the hydrochloric into the culture media was clearly provided against; otherwise the experiments would be perfectly useless.

I have made this protest for the reason that I know that in the last few years many of my professional friends have shown an increased tendency to accept so-called "bacteriological" statements upon the subject of hand disinfection which are absolutely unjustifiable from a bacteriological point of view, and I believe that carelessness in this regard will sooner or later bring its own punishment.

I am an ardent believer in the use of rubber gloves, as I do not consider that any method of hand disinfection with which we are acquainted can give ideal results, and accordingly the only method of rendering our hands practically sterile is by encasing them in gloves which can be absolutely sterilized by boiling.

There are, however, a number of fallacies connected with the use of rubber gloves, which may give rise to a false sense of security. Thus, one may disinfect his hands thoroughly, using whatever method seems best to him, and then put on the gloves in such a manner as to do away in great part with their advantages. In many instances I have seen operators put a glove on one hand and fit it to the fingers with the other uncovered hand, thereby running a great risk of contaminating it at the outset. Moreover, I believe that the glove should be put on under bichloride solution, and a small amount of it left in the glove fingers. Under such circumstances the fingers are surrounded by an atmosphere of bichloride solution and a slight amount always remains at the finger-tips, so that the action of any bacteria, which were not destroyed by the hand disinfection, will be inhibited.

On the other hand, if the gloves are put on from a sterile salt solution, the finger-tips are kept in a warm solution which has no effect upon the bacteria, and accordingly, if the gloves should be punctured, a stream of fluid charged with bacteria may be shot out into the wound and thus defeat the very object for which the gloves were to be employed.

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In reply to the question of Dr. Bonifield, I would say that personally my experience with the permanganate of potash, oxalic acid, and bichloride method has been most satisfactory, and that the more frequently I disinfect my hands the softer they become. On the other hand, I am perfectly willing to admit that some persons possess an idiosyncrasy toward the use of these solutions, and their employment promptly leads to the formation of an eczematous eruption. At the same time, it has been my experience that this can usually be overcome by repeated efforts, and I have never known of an assistant at the Johns Hopkins Hospital who could not eventually accustom himself to its use. I, therefore, see no reason to discontinue it, but, at the same time, I am perfectly willing to do so when some other better method is forthcoming; but I should not think of even trying a method which was not based upon the most accurate bacteriological work from the laboratory of an accepted master in that line of investigation.

Dr. Lewis S. McMurtry, of Louisville, Ky.—In such a discussion as this we are prone to exaggerate the importanee of individual methods and practice. While perfect disinfection of the skin cannot be accomplished, from a bacteriological point of view, yet for practical purposes it is effectively and satisfactorily accomplished in a variety of ways. Some surgeons make good use of rubber gloves; others rely upon chemical germicides; still others upon mechanical cleansing; while others make use in a limited way of all these means of protection and purification. All of which illustrates that through varied methods and routes different individuals may accomplish the same end. The bacteriology of this subject approves the clinical observation that the skin is endowed with the power of taking care of its own bacteria; but when the skin is broken that conservative power is lost. For instance, a surgeon upon finding that he has numerous stitch abscesses in his work redoubles his efforts at cleansing the skin and scrubs more vigorously and thoroughly, only to find that this increases the number of stitch abscesses. The experiments of Benike demonstrate that bacteria are easily removed from the smooth, unbroken skin by washing with soap and warm water, that bacteria cannot be removed with any extent of scrubbing and washing when the skin is broken and fissured by violent scrubbing and the use of irritating chemical germicides. The protection of the hands in septic cases by rubber gloves and the avoidance of contamination in our daily work are most essential precautions in this connection.

Dr. J. Garland Sherrill, of Louisville, Ky.—I had not intended to speak on this subject, but in the discussion attention has been paid to cleansing of the skin, and in that part of the technique I think we are likely to overlook some factors of the greatest importance. One of them is that we should not destroy

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the patient's resistance in the skin and the tissues beneath by unnecessary manipulation, as a clean wound will heal better than one that is jagged and torn. Nature will take care of a certain number of bacteria in a wound, provided you give her a fair chance; but if we tear a wound to pieces, bruise the tissues by retractors unnecessarily employed, we are going to produce a fertile soil for the growth of bacteria in such a wound. Therefore, I would urge that we do as little traumatism as possible to the tissues, and obtain careful hæmostasis, stopping entirely the oozing, and good approximation without tension on the stitches inserted. Those are important factors in the production of stitch abscesses, when neglected, and we all know that it is almost impossible to prevent bacteria from getting into any wound.

I desire to speak of one point in connection with rubber gloves. We have admitted that the hands cannot be thoroughly cleansed. I appreciate very much what Dr. Williams has said with reference to bichloride solution being a good thing, but I would emphasize the one point that in putting the gloves on the greatest care should be taken not to rub the hand all over the outside of the glove in so doing, as that is undoubtedly a source of infection which may be dangerous.

Dr. J. W. Long, of Greensboro, N. C.—This has been a profitable discussion; but there is one point, I think, that has not been sufficiently emphasized, and that is the individual peculiarity of the surgeon or his skin. Dr. Mayo hinted at it. Briefly, it is this, that germicides and antiseptics that suit one surgeon will not suit another. For instance, any solution of bichloride or of carbolic acid is very injurious to my skin. I have found in my hospital work that the best thing for my hands, after preliminary cleansing with soap and water, drying with a sterile towel, and rubbing in alcohol, is to immerse the hands and arms in a solution of permanganate of potash, followed by oxalic acid and carbonate of soda. Then by putting on rubber gloves, with the gloves filled with sterile salt solution, I can work for two or three hours, and when I am through my hands are soft and smooth, and are not in the condition they would be had I used bichloride or carbolic acid. Each man is a sort of law unto himself in this regard, and I believe it ought to be considered in connection with hand disinfection.

Dr. W. P. Carr, of Washington, D. C.—The point just made by Dr. Long is a good one. I am just the opposite of Dr. Long in the use of bichloride. I can use it in almost any strength up to 1:100, as I have frequently done, in the dissecting-room, without the slightest injury to my hands; but I cannot touch carbolic-acid solutions without injuring my hands.

I had the pleausure of hearing Dr. Kelly's paper on hand disinfection many years ago, in which he pointed out the fact

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that bichloride did good by encasing the germ in a film of bichloride, which could be precipitated by the use of ammonium sulphide. But it seemed to me that that was rather a minor point, because if the germ is encased in this film of bichloride he is harmless for a sufficient length of time. That bichloride of mercury does prevent suppuration has been abundantly proved by actual experience.

In the early days of antisepsis I was connected with the Emergency Hospital in Washington, where there were absolutely no antiseptic precautions taken except washing of the hands and the dipping of instruments into bichloride solution, and the results were astonishingly good, when viewed from the standpoint of our knowledge of the present day. My experience there has convinced me beyond doubt that there is a great deal of value in the use of bichloride solution; and whether it kills the germ or simply inhibits its action for a few days, the practical result is the same. At the same time, with our present knowledge I do not believe we should depend upon anything of that sort, nor upon any chemical means of disinfection where we can avoid it.

I have watched those who use rubber gloves, as well as those who do not employ them, and, so far, I can see no difference in the results. Until I see some decided reasons for the use of rubber gloves in my own practice, I do not propose to use them. So far, I have not seen any advantage from their use. The danger of perspiration accumulating in the glove and leaking out unobserved through some small hole or through some sudden tear, in my opinion, more than balances any advantage they may have in ease of sterilization.

Dr. Byford (closing).—It is very evident from the discussion that Dr. Williams is a gloveite and I am a bichloridite. He confirmed my statement that we cannot absolutely sterilize our hands. He further explained how I got my good results by stating that bichloride and alcohol inhibit the growth of germs. I resoak my hands in bichloride every ten or fifteen minutes, in order to keep them sterilized. A German investigator, whose name I cannot now recall, has recently conducted a series of experiments in soaking his hands in alcohol. He found that the longer he soaked his hands in alcohol the longer he could operate before the germs from the deeper layers of the epithelium would come to the surface. It would seem to be the same with the use of bichloride. If I dip my hands in bichloride every few minutes or so—*i. e.*, before the effect of the previous disinfecting and hardening has passed off—my hands remain practically sterile. It does not take a long while, as Dr. Bonifield seems to infer, for me to disinfect my hands each time, because I merely have to fortify this film of protection, and not to disinfect them anew from sepsis.

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With regard to Dr. Bovée using a pair of gloves over one hundred times without the gloves becoming sticky and causing him trouble, I must confess that I cannot. I do not think we all can, and I believe we will have to regulate our antiseptic preparations more for the average man. For assistants gloves are useful and appropriate because delicate work is seldom required of them.

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STRANGULATED HERNIA.

By J. B. Murfree, M.D.,
Murfreesboro, Tenn.

In presenting the subject of strangulated hernia for the consideration and discussion of this Association I hope I may be pardoned if I enter too fully into the description of the anatomy, etiology, and pathology of those hernias which are most liable to be strangulated.

A strangulated hernia is a certain morbid condition that very often occurs unexpectedly to the patient, and which eventually results into a very serious pathological state that endangers his life.

It is frequently met with in general practice and often requires the aid of the surgeon to relieve the stricture of the intestine, which tends to destroy the integrity of the bowel as well as the life of the patient.

A hernia may be defined to be the protrusion or extrusion of an organ or part of an organ into or through the walls of its containing cavity. It is the escape of any viscus or tissue from its natural cavity, through a normal or artificial opening, into the surrounding structures.

A hernia may take place from any cavity of the body, but by an almost universal custom the term is used to denote the escape of the viscera from the abdominal cavity, and generally when we speak of a hernia we allude to the protrusion of a part of the abdominal contents through its walls, which in common parlance is called a rupture. A hernia, then, is the escape of any of the contents of the abdominal

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cavity through a normal or artificial opening into the surrounding structures. Hernias are divided into external and internal. Those which protrude upon the external surface are called external, while those that are strangulated within the normal cavity are called internal.

The external hernias are of most frequent occurrence, and are the ones we usually have to deal with, and in speaking of strangulated hernias in this paper I shall confine myself to the external hernias, or those which protrude upon the external surfaces.

Of these there are quite a variety; the principal ones, however, are the inguinal, the femoral, and the umbilical.

The contents of an abdominal hernia are either bowel or omentum, sometimes both. When the hernial sac contains bowel alone it is called an enterocele. When omentum alone, an epiplocele; when it contains bowel and omentum, it is called an epiploenterocele. The portion of the bowel most frequently found in a hernia is the lower portion of the small intestines, but sometimes a portion of the large bowel is found; sometimes a large portion of them, even so much as the whole cæcum with the appendix, and in rare cases the bladder, the stomach, the gall-bladder, the ovaries, and even the uterus are said to be among the contents of a hernia.

But a hernia as usually met with contains either intestine alone, omentum alone, or intestine and omentum both.

Any viscera of the abdominal cavity escaping through either of the abdominal rings and entering the inguinal canal is known as an inguinal hernia.

The inguinal canal is a space within the lower part of the anterior abdominal wall, above and parallel with the inner half of Poupart's ligament; it transmits the spermatic cord, or the round ligament of the uterus, the ilioinguinal nerve, and the genital branch of the genitocrural nerve. Its direction is downward and inward; its length is from one and a half to two inches. Because of its obliquity any hernia passing through it is called an oblique, indirect, or external

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hernia. A hernia which passes directly through the abdominal wall at the external ring is called a direct hernia and internal hernia, because it passes internal to the deep epigastric artery.

An oblique hernia that does not pass entirely through the canal is called incomplete. Both forms of inguinal hernia, the oblique and direct, pass along the course of the spermatic cord and may descend into the scrotum.

In femoral hernia we have the bowel passing under Poupart's ligament through the internal femoral or crural ring into the space between the inner septum and the femoral vein called the femoral canal.

The femoral canal is from a half to three-fourths of an inch in length, extends from the femoral ring to the upper margin of the saphenous opening, and communicates with the abdominal cavity through the femoral ring. A femoral hernia is the abnormal passage of a loop of intestine or a piece of omentum through this canal and out through the saphenous opening into the fascia of the thigh.

An umbilical hernia is the escape of some of the contents of the abdomen through the umbilical opening.

In children it occurs as the result of a defective development of the anterior abdominal wall, due to a failure of the somatopleure to unite.

An umbilical hernia may be congenital or acquired. An acquired umbilical hernia occurs more frequently in the female than in the male. It occurs especially in women who have borne many children and whose abdominal walls are not only relaxed, but also pendulous from the accumulation of fat. Yet I have seen a large and fatal umbilical hernia in a woman who was sterile.

These hernias are usually small, but occasionally they are quite large, and the overlying skin is sometimes ulcerated on account of the pressure upon their coverings, which interferes with the proper circulation of the blood.

The contents of an umbilical hernia are the small intes-

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tines and omentum, sometimes a loop of the transverse colon. Very frequently they are irreducible on account of adhesions, the result of some inflammatory exudation. The coverings of this class of hernias are only the skin, superficial fascia, and the peritoneum.

Strangulation may occur in any hernia, but is most frequently met with in the femoral, inguinal, and umbilical.

"Strangulation is the most serious accident that can happen to a hernia. It depends upon the constriction and obstruction to the blood supply and consequent devitalization of the tissues, resulting from pressure at some part of the hernial sac."

It is accompanied with great suffering; as a rule, the pain is intense and the mental depression very great.

A strangulated hernia is one in which the sac at some point is so tightly constricted that its contents cannot be returned to the abdominal cavity, while at the same time the circulation through the protruded viscus is materially interfered with; there is not only obstruction to the passage of the feces through the bowel, but also an arrest of the circulation of blood through that portion of the bowel which is protruded, and if it continues unrelieved will produce gangrene of the part and the death of the patient.

Strangulation occurs more often in old than in recent hernias, and more frequently in the congenital than in the acquired variety. The causes of the strangulation are:

1. The sudden forcing of an intestine or omentum through a ring or aperture so small that it is tightly gripped from the moment of descent. This is usually the cause of strangulation in a recent hernia, or in an old hernia which has suddenly descended through the patient's neglect to put on his truss.

2. The increase of bulk in the hernia subsequent to its descent and its consequent constriction where it passes through the aperture or ring. This is usually the cause of strangulation in irreducible hernias or in hernias that have

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not been kept up by a truss. Such an increase in bulk may be induced by (*a*) the sudden protrusion of a fresh portion of omentum or intestine on the top of that already down; (*b*) the swelling of the intestine from catarrhal inflammation of the mucous membrane from its becoming obstructed by feces or flatus; and (*c*) congestion and inflammation of the omentum.

The seat of the constriction or, as it is technically called, the stricture, is generally either in (1) the neck of the sac itself; (2) or outside of the sac—*i. e.*, at one of the tendinous rings or other aperture through which the hernia has passed; while (3) in very rare instances it may be inside the sac, the intestine having slipped through a hole in the omentum or become entangled by a band of adhesions.

When the contents of the hernial sac become strangulated it is the most dangerous condition that can occur to it. The strangulation is produced by a constriction of the blood-vessels at some point, producing a consequent obstruction to the natural blood supply, which necessarily devitalizes the tissues, the constriction being due to an unwonted pressure at some point in the hernial sac.

The strangulation is simply the result of undue pressure brought to bear upon the bowel by the tissues through which it passes, by the neck of the sac itself, or by bands formed within the sac produced by an exudative inflammation. In some cases it is produced by a combination of these factors.

When the constriction is very tight the circulation may be completely arrested and gangrene ensues in a few hours. But, as a rule, the arrest is only partial and the gangrene is preceded by congestion and inflammation.

The intestine at first appears red and, perhaps, slightly swollen, but not otherwise altered, while clear, serous fluid in greater or lesser quantity is passed out between it and the sac. It next assumes a mulberry color, and, as the congestion increases, becomes darker and darker, and finally

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black or an ash gray. At the same time it becomes more swollen and loses its bright, shining appearance, becoming sticky, then doughy in consistency, and pitting on pressure; blood is extravasated into it, while the fluid in the sac gets darker and turbid and feculent in odor; finally the intestine sloughs and its contents are extravasated into the sac.

Sloughing or ulceration frequently begins at the seat of the stricture and in the mucous coat, where even at an early stage an impression of the stricture is often seen.

The omentum undergoes similar changes, passing gradually into a state of gangrene.

The intestine above the strangulated portion for a variable distance is congested and distended with fecal matter, while that below is empty and contracted, but otherwise natural.

Simultaneously with these changes a local peritonitis is set up about the neck of the sac, gluing the intestine to the peritoneum; so, as a rule, there is no extravasation into the peritoneal cavity. The sac becomes inflamed; a fecal abscess is formed which, if the patient survives, opens on the surface, leaving him with a fecal fistula.

In other cases general peritonitis supervenes or the intestine gives way above the stricture, and so peritonitis results.

The symptoms of a strangulated hernia are generally well marked, and usually we have but little difficulty in making a diagnosis. Yet some sad mistakes have been made by overlooking a small and obscure hernial tumor from a neglect to carefully examine the natural apertures where a hernia might form.

In every case of intestinal obstruction every outlet of the abdominal cavity should be carefully examined for a hernial tumor. The symptoms of strangulation are the same in every hernia, differing only in degree and intensity.

There is usually a sudden abdominal pain referred to the umbilicus, with a sensation of faintness and mental depression, with a tendency to collapse; there is absolute constipation and vomiting.

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The hernial tumor is no longer reducible, but is tender to the touch and painful on handling. The tumor is irreducible, tympanitic, and has lost its impulse on coughing.

"Pain may be present in the hernia, but is generally referred to the region of the umbilicus; this is over the solar plexus."

The skin over the hernial tumor is usually natural in appearance and sensation, but after gangrene has taken place may be discolored and œdematous, when there will be a cessation of pain.

The pulse is small and frequent, increasing in its rate of rapidity, while the temperature remains normal or perhaps is subnormal.

The tongue at first is moist, but soon becomes dry and brown.

There are decided symptoms of intestinal obstruction; the constipation is complete and the vomiting is persistent; not even any flatus is passed per rectum, although the contents of the lower bowel may be passed naturally or as the result of an enema.

The vomiting is not attended with much nausea or retching, the contents of the stomach being forcibly ejected. The contents of the stomach are at first vomited, and then there is a fluid stained with bile and finally stercoraceous matter. There is a careworn expression of the face, and the features are pinched and anxious; the pulse increases in frequency, is small and wiry, and if the stricture is not relieved the patient will die in collapse, or from peritonitis, or from the exhaustion due to the increasing vomiting.

These symptoms vary somewhat in different patients and under different circumstances.

In young persons with a recent hernia they are more acute, while in older persons with an irreducible hernia they are more chronic in their character. In some the symptoms may be ill defined; there may be but little pain; the patient may vomit but seldom, perhaps only after taking food, and

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the vomiting need not necessarily be fecal; the bowels are but little distended and the temperature may be normal, and yet a stricture of the bowel exist.

But any case with an irreducible hernial tumor, an unyielding constipation, swollen and tympanitic abdomen, with a small pulse increasing in rapidity, should be diagnosed a strangulated hernia.

The prognosis in a strangulated hernia is always bad, for the strangulated bowel soon falls into a state of passive hyperæmia, is œdematous and swollen. These pathological changes steadily increasing, the effects of the stricture soon produce conditions which result in gangrene.

If the constriction is not early relieved either by the reduction of the hernial tumor or by an operation, the patient's life is greatly endangered.

In a very acute case of close strangulation, if left alone, the patient will very likely die in two or three days, and perhaps in less time. In an old and large hernia he may live much longer, but as a general rule the result *is* inevitable.

In some rare cases that have been left to nature the bowel has mortified, the sac and skin has sloughed, and the patient has recovered with a fecal fistula. Yet, at best, the prognosis in a strangulated hernia is bad, the condition being fraught with many dangers even under the best management and treatment.

The treatment of a strangulated hernia requires immediate action, sufficient skill and sound judgment on the part of the surgeon.

The chief indication in a strangulated bowel is to release the bowel from its stricture as quickly as possible with safety, and with as little injury to the bowel and its coverings as is compatible with exigency of each case.

The morbid condition demands prompt and decisive action; there is no time for delay; every hour adds to the danger for the integrity of the bowel, and the life of the

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patient depends in a great measure upon the length of time the strangulation continues.

The use of drastic cathartics and oft-repeated stimulating enemata for the purpose (as supposed) of overcoming the obstruction are not only useless, but are likely to prove decidedly injurious.

The correct treatment of a strangulated hernia is to promptly return the contents of the sac into the abdominal cavity by manual pressure; on failing to do this, relieve the strictured bowel by an operation. The effectual and rational means we have of relieving a strangulated hernia is by taxis and a herniotomy.

I will not presume to attempt to explain to this Association the mode of using taxis or how to perform herniotomy, for all are doubtless more familiar with them than I am.

When a patient with a strangulated hernia is first seen, it will be well to use some preliminary procedures before resorting to the taxis—such as rest in bed, an enema to empty the lower bowel, a hypodermic of morphia, absence of all nourishment, and the placing of an ice-bag over the tumor. After which an attempt to reduce the bowel by taxis should be made, and if it does not readily return an anæsthetic should be given and another effort made. But the taxis should not be persisted in for any length of time. Frequently repeated and prolonged efforts to reduce the hernia by taxis are to be avoided, for serious injury may be done to an already congested and weakened bowel, even to the extent of rupturing its walls.

By means of taxis many cases of strangulated hernia can be reduced, yet there are some where it ought not to be applied—as, for instance, hernias that heretofore were irreducible, when there is much tenderness and inflammation of the sac, when there is general peritonitis, when vomiting of stercoraceous matter and hiccough have existed for any length of time, or when there is any good reason to suspect that gangrene of the bowel has occurred.

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The after-treatment of a reduced hernia consists in rest in bed and a light diet for a few days.

When a reasonable effort at taxis fails to reduce the hernia a herniotomy should be resorted to at once without any delay. After the stricture has been relieved by an operation, the special procedure for obtaining a radical cure should be done.

The particular operation for the radical cure of the hernia must be selected by the surgeon who has the case in charge. My own preference is for the Bassini method.

In conclusion, I would impress upon the members of this Association the absolute necessity for an early operation in all cases of strangulated hernia (when taxis has failed) wherever it may be situated. Delay imperils the life of the patient, favors complications, and cannot accomplish any good.

Therefore, in a case of strangulated hernia the true principle of surgery is to make an intelligent and sufficient (yet not prolonged) attempt to reduce the bowel; failing in this, to cut down upon the tumor and relieve the stricture.

DISCUSSION.

DR. J. MCFADDEN GASTON, of Atlanta, Ga.—This paper has covered the ground so thoroughly that it needs very little discussion, and, like Dr. Haggard, I rise to thank Dr. Murfree for presenting it, as he has had so much experience.

Last year I reported a case of hernia complicated with hydrocele, and I simply refer to my paper read then rather than take up your time now. But the necessity for operation and the preference given by Dr. Murfree for the Bassini operation are worthy of consideration, and I desire to endorse fully what he said. The Bassini operation has been very satisfactory in my hands. As suture material, I have used kangaroo tendon with satisfaction.

DR. J. GARLAND SHERRILL, of Louisville, Ky.—I would like to bring out one point in connection with the management of strangulated femoral hernia. I think it was Tait who recommended in cases of inguinal hernia that it was a wise plan in a case of strangulation to operate above Poupart's ligament, go into the abdomen, and draw the hernia up. This method is not favorable in cases of inguinal hernia, but in femoral hernia that

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is strangulated, where there is a small knuckle of bowel caught, and where there is danger of gangrene, the operation by incision above Poupart's ligament is valuable. There are two reasons which lead to this conclusion, namely, one is that the operation done above the ligament, by slight traction, you can lift the gut away and protect the peritoneal cavity from possible leakage in case of strangulation. One can pick the gut up and examine it thoroughly, and can resect it if he so desires. I have done this in a woman, aged sixty-seven years, with a good result. If you cut the constriction from below, you may lose your patient from hemorrhage in cutting the obturator vessel. Upon one occasion, in dealing with a case of strangulation in a private house in the middle of the night, with the patient almost moribund, and without assistance, I made a nick in Gimbernat's ligament without opening above, and lost the patient from hemorrhage from the abnormal distribution of the artery going around the inner margin of the ring. I think the two points are worthy of consideration in determining upon an operative procedure in cases of strangulated femoral hernia.

Dr. Samuel E. Milliken, of Dallas, Tex.—I have been very much interested in this subject, and wish to thank the doctor for presenting it. It has been some years since I read my first paper on the Bassini operation, and it certainly has served my purpose admirably, with few exceptions. One difficulty we encounter in the Bassini operation is the short surface for attachment to the lower side and the greater liability of breaking down of our suturing. I have endeavored to carry out the idea I got from Kocher's operation of cutting down directly upon the internal ring, and adopt his treatment of the sac without any particular effort at reconstruction. Kocher's method is to cut down directly upon the internal ring and isolate the hernia or do a replantation of the cord internally, and suture the lower segment of the external aponeurosis to the conjoined tendon without having to split up completely the external abdominal ring. I have done this operation five times during the past year, once in a strangulated case, and my results were very satisfactory. One of the operations was done on a strangulated case with a large scrotum, in which there existed a hernia on the other side. I thought of resection, but the patient was not in a good condition, although I operated on the hernia on the other side, made a reconstruction with the same method under cocaine, with a good result.

Dr. William H. Doughty, of Atlanta, Ga.—I wish to say a few words on small femoral hernia. I have had two cases of that kind, both occurring in old women. One of the women was sixty, and the other seventy-nine or eighty years of age. Both of these patients had symptoms of intestinal obstruction, and each had a small tumor down in the groin, the character of which

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could not be made out. In neither of them was it larger than my thumb. In both the women gave a history of having this hernia for years. The woman of seventy-nine years said that the tumor had been there for thirty years at least. I opened the abdomen in each case, and found a small knuckle of intestine in the femoral canal, and pulled it out. In one case the intestine was adherent and came away without any trouble. In the other there was enough damage done to make it worth while to put a graft of omentum around as a protection. Both patients recovered.

DR. BONIFIELD (closing the discussion for Dr. Murfree).—Dr. Murfree requested me to say that he wished to thank the members of the Association for the kindly way in which his paper had been received. He regretted very much having to leave to catch a train, and not to have heard the discussion.

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TWO CASES OF PRIMARY CARCINOMA OF THE APPENDIX.

By E. Denegre Martin, M.D.,
New Orleans, La.

Ten years ago this condition was practically unknown and is still comparatively rare, when we consider the very small percentage of cases found in the great number of appendicectomies performed. In looking over the literature at my command I find but one case reported, that of Whipham (*London Lancet*, 1901), where cancer was recognized prior to operation. This case had so far advanced that the growth filled the left inguinal region. It is not my purpose to enter into a discussion of the subject, as time would not permit, but rather to report briefly two cases upon which I have recently operated, and the necessity for keeping these cases under closer observation. Moschowitz (*Annals of Surgery*, June, 1903), in an excellent treatise on the subject, after analyzing a number of cases, concludes that we have few if any symptoms upon which to base a diagnosis. Recurrent attacks should be looked upon with suspicion, as these are always a source of irritation; and if there is anything to be learned in regard to cancer from clinical observation it is that impaired function in any organ is a source of danger. Here again is another argument in favor of removal of the appendix after these recurrent attacks. Whereas, it seems to occur most frequently in the second and third decade, this is, I believe, because appendicitis is more prevalent at that period of life, for both of my cases occurred in patients past middle age.

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In June last I was called by a fellow-practitioner to see a case of appendicitis. The patient was a man, sixty-seven years of age; he was emaciated, and apparently a long sufferer. He gave a history of having had an attack simulating appendicitis about three months prior to my visit. As the physician in attendance had seen the patient only a week before, he knew little of the history of the case and its progress. On examination, I found a tumor about the size of a hen's egg in the right inguinal region, corresponding to the location of the appendix. It was well circumscribed, smooth, and attached at the base. After a careful examination, I confirmed the diagnosis of appendicitis, and suggested the use of ice-bags, restricted diet, and laxatives, hoping to induce the absorption of what I believed was inflammatory exudate.

I heard nothing more of this patient until August 21st, when I was again called by the attending physician to see him. I found the patient vomiting stercoraceous matter, with rapid pulse and suffering excruciating pain. On examination I found the abdomen greatly distended and the tumor three times its original size, undoubtedly the cause of the obstruction. The patient was at once removed to the New Orleans Sanitarium, where I operated upon him, revealing a large cancerous mass involving the entire appendix, the cæcum, and the ileocæcal valve. Finding removal out of the question, I did a lateral enterostomy. This gave immediate relief; the patient rallied from the operation, and seemed for the first eight hours in a fair way to recovery from the operation, when he suddenly collapsed and died without warning.

In July, 1904, I was called to see a second case giving almost the identical history. The patient was a man, aged fifty-four years, rather anæmic, though his pulse was good and general condition fair. The physician in attendance had recognized the case as one of appendicitis, and was treating it by external applications of iodine and flaxseed

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poultices. It was easy to distinguish a tumor of some size in the right inguinal region, but the abdomen was so distended and the area so tender from blistering that a thorough examination had to be abandoned.

In this case I did not see the patient again until August 29th, when I was called in by the attending physician. There was apparently slight change in his condition; he was possibly a little weaker. I thought I detected some fluctuation in the tumor and advised operating. He was removed to the Sanitarium, and operated upon the next day. I found in this case a mass as large as an orange, containing an abscess with probably an ounce of pus. The entire appendix was involved, and the disease had encroached upon the cæcum; the abscess being evacuated, I sutured the tumor to the surrounding peritoneum and inserted a gauze drain. He rallied from the operation, and seemed to do well for the first thirty-six hours, when he developed a fecal fistula, which continued until the time of his death, the last week in November.

In the history of these two cases there is nothing remarkable, yet they teach a valuable lesson. It only emphasizes the more the necessity of operating for appendicitis. The surgeon is usually called in after the disease has become serious or assumed a chronic form, when the inflamed appendix is surrounded by a mass of lymph, which, as a rule, is absorbed within ten to fifteen days. All such cases should be kept under close observation, and if resolution does not take place within the prescribed time, the patient should be advised to undergo an operation. At this stage there is a possibility of eradicating the disease; certainly it is less risk than allowing it to progress in the uncertainty. I should grow very suspicious of any case of appendicitis I was called to see, with a history of a previous attack and a tumor of any size in the region of the appendix. Operation would be far less dangerous at any time than a growing cancer.

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DISCUSSION.

DR. J. GARLAND SHERRILL, of Louisville, Ky.—These cases are so rare that I believe it worth while to say a few words on the subject. Last year in my report upon cancer of the cæcum before the Association, I made mention of the fact that Elting had reported three cases of primary carcinoma of the appendix and thirty-seven he had collected from the literature. In most of the cases the cancer was discovered post-mortem.

Rolleston made a claim in his article on the subject that these growths spring from the mucous membrane of the appendix in the neighborhood of the lymphoid tissue, and he advanced arguments which would seem to prove that fact.

In one of my cases there were two nodules on the appendix. It was a case of colloid carcinoma of the colon. I thought these two nodules on the appendix were secondary to the involvement of the intestine. However, upon this point I am not positive. There were some appearances of the fact that the appendix had been previously inflamed, and it is possible that these nodules may have been the primary seat of the lesion. I believe we may safely say that appendicular inflammation is a predisposing cause, to say the least, in the development of carcinoma, and I believe it is a wise thing to have all appendices examined to establish the frequency of this disease, and also to give us some idea as regards prognosis. I think that in time we may be able to determine more accurately the symptoms of this condition, but I doubt whether we will ever be able to make an absolute diagnosis before operation in these cases.

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A CASE OF RUPTURE OF THE DIAPHRAGM.

By George S. Brown, M.D.,
Birmingham, Ala.

History. F. G., white, aged twenty-seven years; six feet tall; weight, 190 pounds. Had never been sick except that he hurt or strained his side slightly about two years before the present injury.

On February 10, 1902, he ate a light breakfast at 7 o'clock and no dinner. At 1 P.M. he was on a ladder fighting fire. On the water being turned too forcibly into the hose the nozzle jerked him suddenly over, doubling him up on his right side. He had a sharp pain at the time, but worked on for three or four minutes longer before a feeling of faintness and nausea compelled him to quit and go home in a cab.

His family physician found him complaining of spasmodic pains, and spitting up instantly all the water he drank. His pulse and temperature were normal. On February 11th his condition was the same. He had no rest from the pain and spitting up, except when under large doses of morphine. On Wednesday he was given several doses of salts which he retained, but that afternoon his pulse and temperature went up alarmingly and the writer was called in. At this time he was having occasional and very painful hiccough, was and had been all along obstinately constipated, and was vomiting nearly all the water he drank. The diagnosis was rupture of the diaphragm, but owing to total inexperience with this rare accident, and to total ignorance of the literature of the subject, we both had in mind a loop of small intestine protruding through into the pleural cavity. Had we even

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thought of its being the stomach the examination would have shown no symptom wanting. We were surprised at finding the stomach tympany so high under the diaphragm, while the stomach region seemed rather flat than otherwise.

There was tympany very high along the chest wall in front, and we noticed the metallic tinkling that usually accompanies distended stomach; we noted, too, that the stomach region proper was flat, but the normal boundary of the pleural cavity was flat as with fluid, so that the fact that the stomach was above the diaphragm did not suggest itself. His pulse and temperature had gone up so rapidly during the afternoon and evening that his condition was regarded as desperate, from a probable strangulating of the hernial gut, and the bare idea of examining for the stomach in the pleural cavity did not occur to us. He was ordered to the hospital with the idea of operating upon him if his condition would admit of it in the morning. The next morning I had a call to go out of town and was informed by telephone that the patient was very much better, that his pulse had come down, that he was not vomitnig nor hiccoughing so often, and that his bowels had moved. I did not have time before or after that to read anything about the subject. I returned next day at noon to find that he had not been better, but had been in about the same condition all the time. As I entered the hospital I was told to hurry, that the patient had that moment been taken very much worse. I found him sitting up in bed, in seemingly the greatest agony anyone ever had. His chest was bare, and the first thing noted was that his heart was beating violently one inch to the right of the sternum. His pain was relieved by the administration of amyl nitrite, and then chloroform anæsthesia. On examination the left pleural cavity was found to be full of fluid and upon aspiration it was thought to be blood stained.

The diagnosis then made was that the stomach was in the pleural cavity, and that it had ruptured and poured out

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the water it had retained for several days. The patient's condition was so bad now that it was deemed useless to try to do anything for him, and he died an hour later. The autopsy revealed the fact that the stomach and all of the great omentum had passed into the pleural cavity. The tear through the diaphragm was about three inches long and was well out toward the chest wall, and could easily have been reached by resecting the eighth and ninth ribs. The omentum lay behind, and this caused the mistake of supposing there was fluid in the chest (likely from gangrene of the loop of bowel supposed to be incarcerated). Had it not been for this it would have been impossible to miss the real condition. The real condition was overlooked simply because we did not know that the stomach is the most frequent organ contained in these ruptures. Had we thought of it as even the remotest possibility, the diagnosis would instantly have been clear. While this accident is very rare, I think the chief feature of interest in this report is the remarkable psychological state it is possible to get into to admit of such a blunder.

After the autopsy I found time to learn the following facts from a very interesting article in the *Reference Handbook.*

Hernia of the diaphragm may be either congenital or acquired.

Of 267 cases, 150 were acquired and 117 were congenital. The congenital hernia is always contained in a sac, the acquired rarely so. Of the 150 cases reported by Lacher 127 were of the left side. The liver in a great measure protects the right side, and the left side is somewhat weakened by the passage of the œsophagus.

The abdominal organs constituting the hernia, to mention them in the order of their frequency, are: stomach, omentum, colon, small intestine, spleen, pancreas, and kidney.

In traumatic hernia injury of other organs may mask the symptoms due to the hernia proper.

The physical signs vary according to the size of the hernia

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and the organ constituting it. When it is large the chest will seem bulged and the abdomen hollow. Respiration is more or less costal, and Littel's phenomenon will indicate whether or not the movements of the diaphragm are absent or diminished or unequal on the two sides. Dyspnœa is usually an early and prominent symptom.

Palpation may show diminished movement of the liver, spleen, or stomach on respiration, or it may detect the movements of the stomach or intestines above the diaphragm.

Auscultation may reveal, in addition to the signs of embarrassed lungs and heart, abnormal deglutition sounds, metallic tinkling, or borborygmi.

Percussion will elicit either a flat note, indicating a solid body or fluid, or it will give a tympanitic note if the stomach or intestines are implicated in place of the normal pulmonary resonance.

The pain is a most important symptom, being severe and most persistent and intractable. Hiccough, sudden and painful, and sudden vomiting on swallowing are usual and are valuable in confirming the diagnosis.

The diagnosis is difficult only because the accident is such a rare one that it is not suspected. By this theory only can we account for the fact that of 300 cases reported by one writer the diagnosis was made before death in only 7.

Should the trouble be suspected in an uncomplicated case, such as I have reported, all the symptoms spoken of above will perhaps be found, though some may be modified in character and degree.

Prognosis. In 33 cases caused by stab wounds the mortality was 88 per cent. I have not been able to find any statistics in regard to the mortality of uncomplicated cases. Bennett in Ashhurst's *Surgery* says that doubtless many recoveries take place in cases in which the diagnosis is never made. He mentions 1 case of a man whose stomach lay in his pleural cavity fifty-two years; that a number have been reported that died of strangulation weeks, months, and

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years after the accident. Although at that time, he admits, at least eight successful operations had been done and that probably all of the recovered cases would eventually die of strangulation, he still says we should be slow to operate.

Stewart Hart in the *Reference Handbook* says that strangulation is always to be dreaded, but that death may and usually does come from sudden compression of the heart or lungs by the sudden filling of the hernial contents with gas or, as in our case, by the sudden rupture of the contained viscus and the filling of the pleural cavity with the fluid contents.

Treatment. Contrary to Bennett's caution, which it is only fair to say was written some years ago, I think we cannot operate too quickly. Successful cases have been reported by Posternski, Llobet, Dalton, Humbert, Mikulicz, and others, according to Hart, but he does not give any particulars as to the nature of the complications nor of the time at which the operations were done.

According to him the hernia is best approached through the pleural cavity. The eighth and ninth ribs should be resected to the extent of three inches. This will allow of the hernia being reduced and of the rent being sutured. In our case this would not have been difficult, as the opening in the diaphragm was out close to the chest wall. It has occurred to me that keeping up respiration by means of the Fell-O'Dwyer apparatus would materially add to the safety of the operation in preventing syncope from collapse of the lungs when the pleura is opened.

DISCUSSION.

DR. E. DENEGRE MARTIN, of New Orleans, La.—A word or two may prove of interest in the discussion of these cases. I have nothing to say in regard to the diagnosis. Cases of resection of the ribs for sarcoma have demonstrated to me that opening the pleura can be done without much trouble. It has been my good fortune to have been associated with Dr. Parham in three cases in which he operated successfully.

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The essayist referred to the Fell-O'Dwyer apparatus as an aid in these cases. We tried the Fell-O'Dwyer apparatus in our first case, but it failed in the other two cases. It did not succeed at all, and we were very much annoyed with it. The thing to do in these cases is, just as soon as you have made the resection and opened the pleura, to take hold of the lung and suture it at once to the surrounding opening. If this is done, you will find that there will be very little danger of syncope. As I have said, in the first case the Fell-O'Dwyer apparatus worked very well; but in using it you must work it accurately, not over sixteen times a minute, and care must be taken not to force the air too rapidly into the lungs. If you find that you cannot introduce the tube into the trachea, do not hesitate to go ahead and suture the lung to the chest wall. You can do this and take your time in closing the hernia. A thoracotomy is unquestionably the proper and safe route to a diaphragmatic hernia.

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ENCEPHALOMENINGOCELE.

By W. D. Haggard, M.D.,
Nashville, Tenn.

The malformations of the brain and its coverings constitute an interesting group of pathological conditions. The three chief varieties are encephalocele, meningocele, and hydrencephalocele. The first is the most frequent and is a congenital hernia of the brain called cephalocele or "hernia cerebri." Meningocele, the least frequent, is the bulging of one or more of the membranes through a hiatus in the skull covered by the scalp. Hydrencephalocele, the most common of the large tumors, is a protrusion of brain tissue covered by skin and containing a central cystic cavity usually communicating with one of the ventricles of the brain. There may be a combination of brain and cerebrospinal fluid in the sac—encephalomeningocele, which is the rarest of all. Berger claims that the brain tissue found in meningoceles is neoplastic in character and has no physiological importance and may therefore be disregarded from a surgical standpoint.

These various cephaloceles can be situated at any part of the skull. They most commonly occur in the mesial line. Pure encephaloceles are most prone to appear in the front, meningoceles occipitally. They may protrude through any suture or through an independent opening. They occur through sphenoid and ethmoid openings and into the mouth, nose or orbit, and may protrude through the foramen magnum. Cases have been reported in the neck.

The etiology of these formations is not clear. Many explanations have been offered. They probably apply to dif-

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ferent types. The various theories may be grouped under four heads:

1. Union of the brain sac with the amnion, interfering with development of bone.

2. Disease of bone causing non-union or porosity, with protrusion of the brain covering through the aperture, probably coexisting with disease of the brain itself.

3. Intrauterine hydrocephalus causing a bulging of the membranes as the bones come together.

4. Exostoses or protuberances on the pelvis of the mother, upon which the fetal head presses, interfering with development. External injuries have been supposed to cause these malformations.

Other deformities, such as cleft palate, hare-lip, spina bifida, and club-feet, are often associated conditions.

Encephaloceles are usually small, opaque, smooth, and not pedunculated. They may have thick walls, a wide base, pulsate on violent exertion, and become enlarged during sneezing etc., but the tension is reduced during sleep. They grow very slightly and may exist for a number of years. Pressure causes dilatation of the pupils, strabismus, vomiting, convulsions, and other symptoms of brain compression. The opening in the skull occasionally can be felt. Sometimes they are changed by retrograde processes into a meningocele, and occasionally by ossification the openings close like a fontanelle. Many of the serous cysts of the scalp have probably been encephaloceles that have lost their communication with the interior.

Meningocele would appear to have a simpler etiology and be dependent upon a protrusion of a part of the primary cerebral vesicle, from tension or an irregular division, in utero, of the brain into its different parts. When of pure type they contain fluid alone and are covered by one or more of the investments of the brain. They present, therefore, fluctuation and are translucent. They are usually pedunculated. There is no pulsation or symptoms from pressure,

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Case of encephalomeningocele

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except that the child is usually restless when lying on the tumor. They grow much larger than encephaloceles, but not so large, usually, as the hydrencephaloceles. When small they are sometimes reducible. Developmental defects of the brain are commonly associated, such as hydrocephalus, porencephalus, and microcephalus.

Hydrencephalocele is oftenest occipital and contains the posterior cornua of the dilated fourth ventricle. It grows larger than any of the congenital brain tumors. Park says: "Some of the largest occipital cephaloceles are in fact hydrencephaloceles which contain the occipital lobe of the external cerebellum, and perhaps often the quadrigemina, along with the distended posterior cornua of the lateral ventricle and the dilated fourth ventricle, with the Sylvian aqueduct already distended with the contained fluid. Along with the membrane which constitutes the hernial sac are also other partitions, such as the falx, tentorium, and so on, but usually more or less distorted and deformed."

The skull is usually deformed also and the brain inside is microcephalic. Horsley has been able to determine whether or not brain was included in these tumors by the faradic current. Sometimes it can be felt. Fortunately these cases rarely live long, if they do not perish during delivery. They die of marasmus or, if the membranes rupture, of septic meningitis. The small sincipital encephaloceles sometimes live to puberty and the mental faculties are alert. Out of 75 cases collected by Laurence, 6 reached adult life.

Careful examination, congenital origin, and the tenseness of the smaller encephaloceles on crying, which are the ones most likely to be mistaken, will usually serve to discriminate them from other conditions, such as wens, fatty tumors, dermoids, and cephalæmatoma. They have been mistaken for abscesses and opened.

TREATMENT. About everything from simple protection by a starch bandage to surgical removal has been tried. Aseptic puncture and compression have sometimes obtained a cure.

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Injection with Morton's fluid has also been occasionally successful. Incision or simple ligation would hardly find favor at the present time. Operative removal is indicated in many of the meningoceles. The presence of cerebral tissue is not a contraindication except in hydrencephalus. Bergmann reports 2 successful cases of operation for encephalomeningocele by Ochmitz, of St. Petersburg. Broca said all who were operated on before the first month died. Annandale cured 1 case aged seven weeks, and recently there have been reports of cases of a few days old that have been successfully operated. Even after a successful operation they sometimes die of convulsions from overdistention of cerebrospinal fluid, and sometimes hydrocephalus develops. The operative mortality is very much more encouraging than formerly. Chipault collected 50 cases of operation for meningocele in the last nine years, with only 9 deaths.

The following case is an example of a meningocele containing cerebral tissue:

CASE.—Male, aged four months, was sent to me by Dr. F. B. Sloan, of Cowan, Tenn. The child had been born in a mountain hovel of an abandoned mother, who had no attendant. A tumor as large as a goose-egg was observed on the back of the head at birth. It grew progressively and at the age of four months measured twenty-three inches in its long or transverse diameter and seventeen inches in the horizontal diameter. It was kidney-shaped and the child had to be carried on a pillow with great care. The child weighed six pounds, and the tumor five pounds after removal. It sprung from the occipital region. It was smooth, transparent, exquisitely fluctuant, very thin-walled, and destitute of hair, save at the pedicle and about the hilus, where there was a rather abundant long growth. The bloodvessels could be plainly seen. The child, while small for its age, was otherwise apparently normal and seemed hearty. The knee-jerks were present and sensation normal.

Handling the tumor excited crying. The sac was quite

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tense and did not distend upon crying. There was no pulsation. The pedicle was about the size of four fingers and very short. There was no spina bifida or other deformity. The forehead receded markedly and gave an ape-like appearance to the face.

The case was seen by Drs. R. E. Fort, S. S. Briggs, and O. H. Wilson, who all advised operation. It was not thought at all promising, but clearly seemed the only thing to do.

Considerable difficulty was experienced in preparing the scalp and tumor for operation, as it had not been cleansed during the four months of the child's life. It was also difficult to handle the tumor. No anæsthetic was given. An elastic ligature was placed around the base of the pedicle, and with large clamps above it the tumor was amputated. In so doing it was seen that brain tissue was cut through, which fact could not previously be determined. The aperture in the skull was about the size of a quarter of a dollar. The bleeding vessels were tied with catgut, and the scalp closed over with interrupted sutures without drainage. The wound was sealed with collodion and cotton fibres.

The contents of the tumor was yellowish fluid, specific gravity 1006, slightly alkaline, with considerable albumin. There was a small amount of cerebral tissue spread out over the lining at the bottom of the sac.

The child showed symptoms of shock and was given six ounces of saline solution subcutaneously and $\frac{1}{240}$ grain strychnine. He reacted well from the operation, but was unable to nurse from that time on. All the functions of the body were performed normally. There were no convulsions. The pupillary and patellar reflexes were normal. There was a primary rise of temperature to 104° six hours after the operation, which receded to 99° on the second morning, and rose on the third day to 102°, but was never that high again. He exhibited a panting-like action of the tongue (polyapnœa) continually.

He had been taking breast milk from a spoon satisfactorily

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up to this time. The wound had healed primarily and the sutures were out. He died rather unexpectedly on the ninth day. For two days previously the only suspicious symptom was a lateral nystagmus. The temperature had not been above 100° in the four days preceding.

After death the skin flaps were separated and a small quantity of pus was found under them which the second collodion dressing had not allowed to escape. There was underneath the cerebral stump a considerable collection of cerebrospinal fluid.

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AN EASY METHOD OF INSTITUTING PERITONEAL GAUZE DRAINAGE THROUGH THE VAGINA AFTER ABDOMINAL SECTION.

By W. D. Haggard, M.D.,
Nashville, Tenn.

The fancied necessity for drainage after abdominal section has been greatly lessened by our knowledge that the peritoneum can easily dispose of considerable amounts of blood and serum and that ancient accumulations of pus are generally sterile. The real necessity for drainage has been greatly minimized by perfected methods of asepticity, by careful repair of denuded peritoneal surfaces, by efficient hæmostasis and control of all oozing, and by avoidance of unnecessary trauma in rude and violent manipulations. Classes of cases that were formerly drained routinely are observed to do quite as well without drainage; yet there is a small minority which requires it.

Abdominal drainage has been very generally abandoned for vaginal drainage when possible, except in general peritonitis, where the very large glass tube above the symphysis, combined with the upright sitting (Fowler's) position, leaves little to be desired. Glass is slow to excite lymph adhesions and a large area is drained longer than by any other material. In operations in the pelvis, drainage through the abdominal incision has the disadvantage of being more remote from the area to be actually drained, and therefore unnecessarily involves viscera that are above the infected site. The more or less inherent dangers of all drainage—*i. e.*, adhesions, intestinal obstruction, and fecal fistulæ—are invited.

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The likelihood of wound infection from the drain resulting in hernia is perhaps the chief disadvantage. About all infected abdominal incisions have subsequent hernia, which is very infrequent in wounds healing aseptically, and without the interposition of a drain. When, therefore, abdominal drainage is used, it is better to bring it out through a separate, small stab wound, and close the incision in its entirety. Where the drain must extend for some distance, and adjacent to uninfected viscera, to the point of delivery, gauze should not be unprotected along its whole length. It can be wrapped in gutta-percha tissue, like a cigarette, but of any size, or encased in a split rubber tube.

In pelvic work drainage through the cul-de-sac into the vagina has the advantage of being very close to the area to be drained, is at the most dependent point, escapes through a natural avenue, is devoid of the danger of hernia, and less likely to occasion fistulæ, bladder disturbance, and secondary obstruction from adhesive bands. It, however, has the disadvantage that the vagina is difficult to render sterile and that infection of the peritoneum may extend from that source. Occlusive protection to the drain from the outside is also somewhat more difficult. The greatest objection to vaginal drainage is the difficulty of making the puncture through the cul-de-sac and passing the gauze into the vagina. It is this obstacle that I have in my own work, to say the least, greatly overcome, and which is the purpose of this communication to describe.

The usual method of introducing gauze drainage has the patient let down from Trendelenburg's position, or unstrapped, if horizontal, the legs flexed, and the assistant, or sometimes the operator, introduces the fingers into the vagina and makes pressure into the posterior fornix with the fingers or forceps. The operator cuts through at the bottom of Douglas' space and passes the gauze down to fingers or forceps. The assistant has to resterilize his hands or, better, be eliminated from the subsequent steps of the operation.

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Aside from the time consumed in this method, which is sometimes considerable, the chief objection is that the vagina is often not prepared, and if so there is likelihood of carrying infection from the outside.

Noble, of Atlanta, simplified the procedure by designing two instruments which he presented at the Southern Surgical and Gynecological Society in 1901. One was a counter-pressure instrument, much like an enlarged Hunter depressor, which was introduced into the vagina and by pressure fixed the posterior fornix. It could then be punctured by scissors from above with ease and without danger of injuring any other structure. The scissors has a shoulder on the outside of each blade to prevent the margins of the incision from slipping up on the handles as they are opened to stretch the incision to the desired width. This technique relieves the procedure of some of its drawbacks, but the instruments are not in the armamentarium of every surgeon, and, if they are, would not always be at hand. I attempted to simplify that feature still further and used, in quite a series of cases with considerable satisfaction, an ordinary tablespoon, which was inserted into the vagina and made to put the fornix on a stretch, and while taut a scissors was thrust through from above into the bowl of the spoon.

Unfortunately in a bad pus case in a girl aged eighteen years, requiring drainage, the spoon in its introduction reduplicated the rectovaginal septum in front of it and in cutting through, as I supposed into the vagina, the rectum was wounded. The resulting fistula into the vagina readily healed, but caused me to abandon the device. It illustrated, however, the efficacy of pelvic gauze drainage in protecting the peritoneal cavity from contamination in injuries of the bowel low down, if for any reason they are not, or cannot be, sutured adequately.

In another series of cases, after preliminary disinfection of the vagina, before operations on the abdomen, where the vagina was packed with sterile gauze, I noticed how easily

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the mass of gauze could be felt and identified from above. In cases where drainage was necessary, I simply cut down upon this gauze through the cul-de-sac and attached the drainage gauze to the vaginal gauze by a safety pin, and after closure of the abdomen the drainage gauze was drawn down by withdrawing the original vaginal packing. There are, however, many operators who do not pack the vagina as a routine, and this method has considerable limitations. Many sections are undertaken in which the necessity for drainage is not anticipated; indeed, it is not contemplated in the majority of cases. Sterilization of the vagina by ordinary antiseptic douches is notoriously inadequate. Few men have the vagina "scrubbed up" on the table when the operative procedure is limited to the abdomen, and unless the vagina is prepared beforehand through a speculum, it is usually not in an aseptic condition for the institution of drainage when it finally *is* determined upon.

To obviate all these difficulties in the way of establishing drainage in the usual manner, and, as an evolution of the methods heretofore mentioned, I have, for the last year or more, in a considerable number of cases, employed the following easy method with entire satisfaction.

After the intrapelvic work is completed and drainage *is* deemed necessary, the gauze is introduced into the cul-de-sac and arranged as desired in plaits, the omentum is drawn down on the right side over the operated area and the sigmoid on the left, and the abdomen closed with the gauze left in. After the abdominal dressings are applied, the patient is drawn with hips to the edge of the table and the vagina cleansed thoroughly as for any operative procedure. The bunch of gauze can be easily felt as a mass behind the cervix, which is steadied and drawn down with a volsella, and the fornix opened with one snip of the scissors, cutting directly against the gauze, which is seized with forceps and drawn down. It can be done as quickly as it has been described. It has the advantage of being done under absolute aseptic

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control from the vaginal side and after the abdomen has been closed from above, so that no danger of contamination is incurred. The drainage strip should be tied to the packing in the vagina so that there will be no possibility of ever leaving any gauze behind.

Iodoform gauze should be used in the vagina, as an effective occlusive dressing is desired. It stays sweet longer than plain gauze. The one-inch strips of 5 per cent. iodoform gauze with selvaged edge, in a glass container, has been found most convenient.

The life history of gauze as a drainage material is very short. The meshes soon become blocked with exudate, and its capillarity ceases. The gauze should not plug the aperture too tightly. The chief function of gauze drainage in a severely infected region of the peritoneum is not so much for its capillarity as for the quarantining of that area from the general cavity by the exudate which is so promptly and effectively thrown out around the area, with the gauze as the excitant. That is Nature's plan, when she is successful, of segregating all infections. The gauze invites and initiates this very plan.

Occasionally an abrupt rise of temperature occurs where gauze drainage is employed in conditions where free exudation occurs over a long time, and, if it is withdrawn, a little quantity of serum will sometimes be found pent up. In cases of that sort the gauze should be withdrawn a little each day. Generally, however, if gauze drainage is needed at all in the peritoneum, it should be left six days. It can then be easily withdrawn. The walls of exudate around it will be well formed and they are stiff enough to afford a pipe-like drain from any septic point for some days without irrigation. If gauze is withdrawn too soon, the fresh granulations will be disturbed and bleeding occurs and atria for fresh injection are opened by the trauma. The external part of the tract may close if not kept open by frequent dressings.

I have not attempted to define the cases which require, but merely to describe this simpler way of establishing gauze drainage through the vagina in cases requiring it.

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DEMONSTRATION OF A NEW TABLE FOR PHYSICIANS' USE AND INSTRUMENTS.

By H. J. Boldt, M.D.,
New York.

NEW TABLE DESIGNED FOR PHYSICIANS' OFFICE USE, AND PARTICULARLY ADAPTED FOR PELVIC WORK.

The absence of a suitable office table of modern design, admitting of easy and rapid adjustment to meet the various requirements for examination by the surgeon or the gynecologist, has prompted me, with the assistance of the Kny-Scheerer Company, of New York City, to design a suitable table which answers every requirement.

This table (Fig. 1) is constructed of steel, finished in white enamel, and it admits of easy adjustment, whereby the patient may be placed in any position without causing fatigue. It is easily and quickly depressed at either head end or foot end, or tilted laterally to the right or left by turning the wheels to the side. It is particularly adapted to the knee-chest position for the examination of the bladder and catheterization of the ureters, if used with the side-plate shoulder support and body strap, as shown in Fig. 2. The table is equipped with adjustable nickel-plated heel stirrups, which can be adjusted to any desirable angle. It has an adjustable plate to facilitate the Sims position perfectly, as shown in Fig. 3.

The table is strongly constructed, and when in use as an operating table the side plate can be placed horizontally to hold an instrument tray or a hand basin. The dimensions

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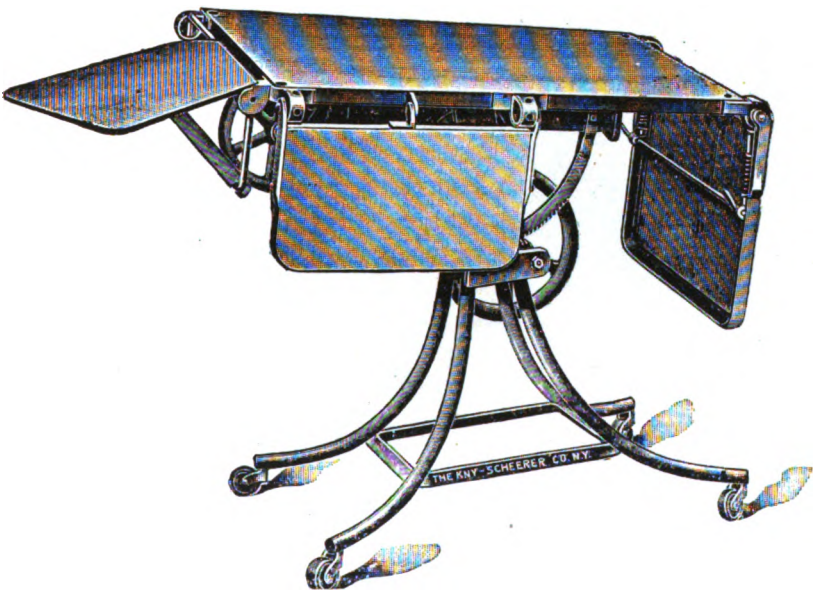
of the table top are 22 inches wide, 36 inches long. The total length, including the Sims plate and head end when raised, is 66 inches. The height is 31½ inches. The side shelf for the knees is 10 inches wide by 18 inches long.

Appreciation of the popular success of my former efforts in designing a general operating table with the assistance of

Fig. 1



the same firm warrants me in submitting this new model of office table in the anticipation that the profession may find it of assistance.

CUL-DE-SAC PERFORATOR FOR OPENING PELVIC ABSCESSES, ETC.

For about fifteen years the generally adopted custom of opening, with scissors or a scalpel, the cul-de-sac of Douglas, no matter under what indication, has been given up by me, and, instead, I have used for the performance of this oper-

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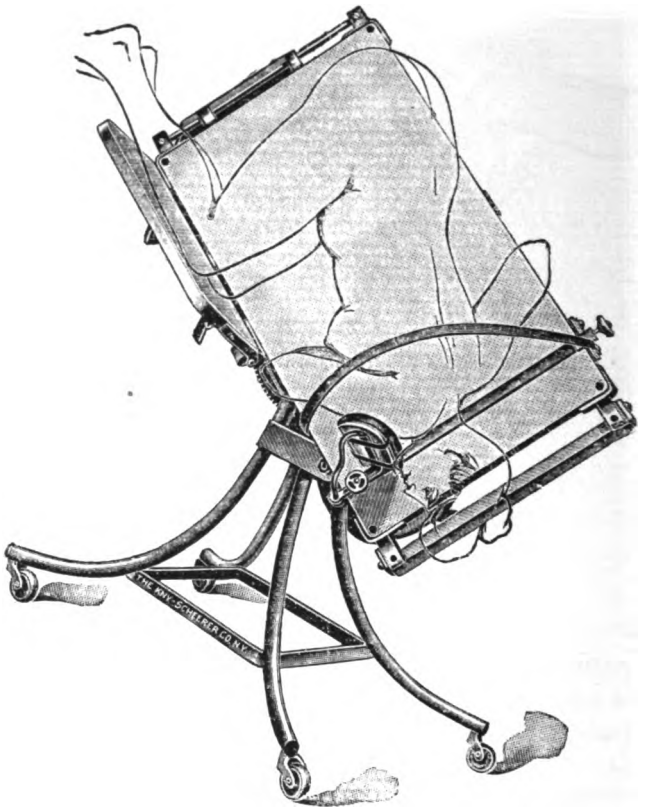
ation a Palmer uterine dilator, the ends of which have been ground down to a sharp point. After opening the cul-de-sac and spreading the branches of the perforator another instrument is introduced through the opening made, if this is not sufficiently large to accomplish the object desired.

FIG. 2



The latter instrument is "Bischoff's sphincter-ani dilator." With this my name has incorrectly been connected. I have not the honor of having invented this instrument, although I was the first to use it in doing pelvic surgery. Both instruments are sometimes inadequate to meet the require-

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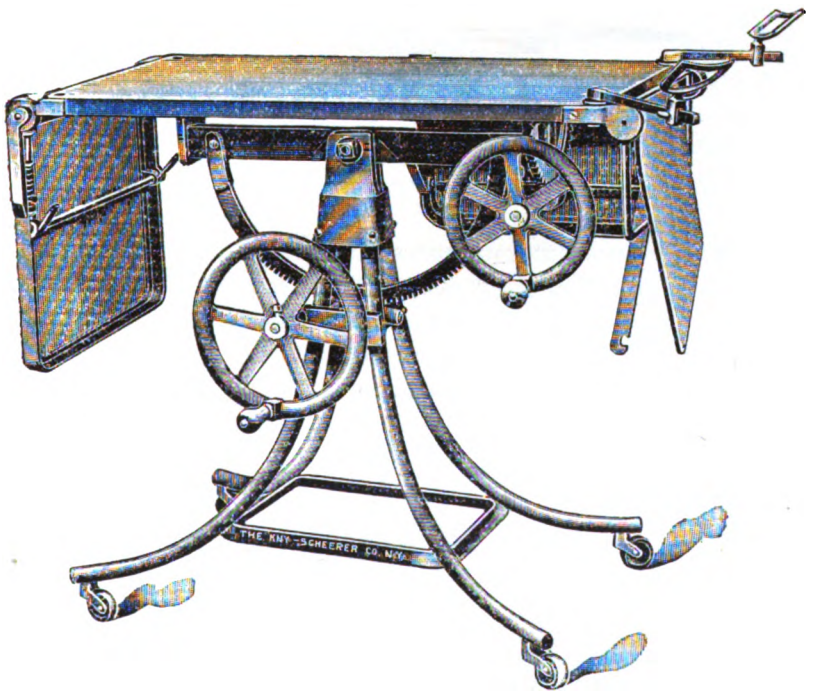
ments in individual cases. The sphincter dilator does not answer the purpose in those patients in whom the pelvic floor is unyielding because of inflammatory processes. In such instances the branches of the dilator yield more or less, according to the resistance to be overcome by them, thus preventing the opening from being made large enough to introduce the hand into the pelvis, if this is desired. A

FIG. 3



further objection that I have found when using the Bischoff dilator is the occlusion of view by the handles, so that one cannot well see the field of work. The objections to the sharpened uterine dilator are that the opening made by it is not sufficiently large to introduce the second instrument between the blades, thus necessitating the withdrawal of the perforator before the dilator can be introduced. It is then

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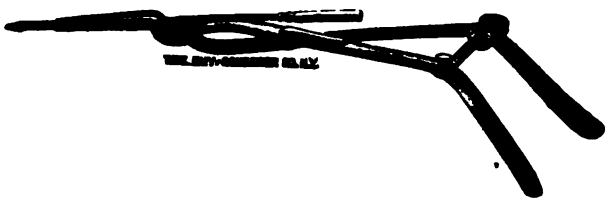
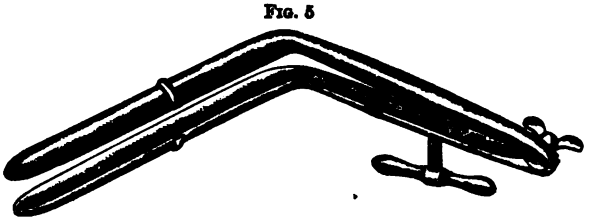
necessary to guide it by means of the examining finger through the small opening, and that the sharp points, being in the pelvis and spreading apart while the handles are being pressed together, give rise to a possibility of injury to intestine. I have detailed the objections to the armamentarium used by me for so many years because the instruments are extensively used by many who have seen me use them.

FIG. 4



To overcome the objections spoken of I have had the Kny-Scheerer Company, of New York, construct an instrument for me which I term a cul-de-sac perforator. (See Fig. 4.) This instrument permits of the opening being quickly made into the cul-de-sac of Douglas by means of the trocar, which is held between the blades of the dilator.

FIG. 5



The trocar bulb rests on the blades of the dilator; thus the trocar is prevented from receding while it is introduced. As soon as the perforation is made the blades of the dilator are slightly separated by pressing together the handles, and the trocar is withdrawn. The blades may now be separated to their full extent, making an opening of sufficient size to answer the purpose in most instances. Should it be desir-

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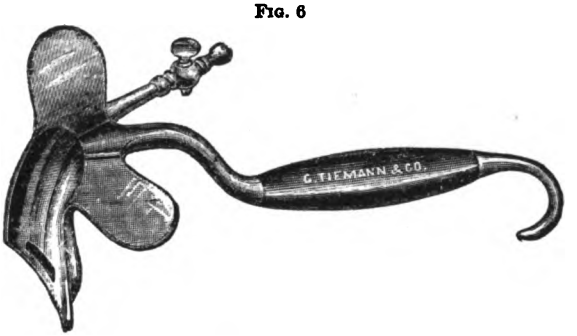
able in the particular case to enlarge the opening more, it may be done by introducing between the blades of the perforator the blades of the dilator. (Fig. 5.) With this instrument an opening may be made large enough to introduce one's hand through. The pelvis may then be thoroughly explored manually. The handles being at an acute angle with the blades, the pelvis may be packed, with gauze between them, without the view being obscured.

For opening the cul-de-sac to operate on pelvic abscesses, retrouterine hæmatoceles, pyosalpinx sacs, in fact any form of vaginal section, these two instruments are very valuable, and, in my opinion, offer a superior means of making a sufficiently large opening with greater safety for the patient as regards hemorrhage than a knife or scissors ; besides, the operation can be more rapidly done with the dilators described. A very large number of vaginal sections done according to the technique described permits me to recommend the method highly.

IRRIGATING SPECULUM.

The advantage of the speculum is that the field of operation in the vagina is constantly clean, and the flow of water

Fig. 6



is readily controlled by the operator by the adjustment of the small cork near the speculum blade.

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VERMIFORM APPENDIX INVAGINATING PROBE.

It has become customary with many surgeons when opening the abdomen, even for another purpose than that for the removal of the vermiform appendix, to remove also or to invaginate that seemingly useless structure. I prefer invagination or inversion to appendectomy whenever the former can be done. To overcome the inconvenience accompanying the customary methods, I have had a very small spur attached to an ordinary silver surgical probe. After the mesoappendix is tied off and all particles of mesoappendix

FIG. 7

are stripped off from the appendix, the spur is inserted into the tip of the latter. This prevents the probe from slipping off, and the inversion can now be readily accomplished in a few moments. One suture over the opening closes it, and then this suture is usually tied together with the ligature which was used to tie off the mesoappendix. Having found this simple little device, made on my suggestion by the Kny-Scheerer Company, of such practical utility, I place it before the profession for trial. The small point should not be more than a millimetre long, and as thin as the point of a cambric needle.

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THE STERILIZATION OF CUTTING INSTRUMENTS.

By H. A. Royster, A.B., M.D.,
Raleigh, N. C.

It cannot be denied that the older surgeons possessed some advantages not given to us of the present day. Among these was the marked excellence of their cutlery. Whether this was due to superior material and workmanship or to less wear and better care, is an open question. Probably both factors serve to establish the truth of the observation. No knives have been made to surpass and few to equal those used by the French surgeons thirty years since, but certain it is that those instruments never had the misfortune of being subjected to the ordeal which the twentieth century scalpel has to undergo. In former times operators, being blissfully ignorant of the origin of sepsis, were rewarded by having cutting instruments that would cut. All their troubles came after the operation, none before. With us the reverse is true. Our preoperative inconvenience prevents the occurrence of postoperative disaster.

To every one who does much surgery, however, it is only too evident that all methods now in vogue for sterilizing instruments dull the edges of those intended for cutting purposes. Not many years ago the custom was to boil instruments for an hour previous to operation. Now no one thinks of leaving them in over fifteen or twenty minutes, but this is frequently long enough to render a knife unfit for use, even though it was perfectly sharp beforehand. Many

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operators have of late departed from the foregoing method and adopted other plans, by which they hoped to preserve the edge and still retain the aseptic property. For the purpose of studying the principles involved, our attention will be solely confined to knives, since it is understood that scissors are difficult to sterilize except by prolonged boiling, and the need of so fine an edge in their case is not so imperative as it is for the knife.

Indeed, thorough sterilization of knives by boiling does not seem to be demanded if the practice of many of our best surgeons is to be taken as a guide. Though spoken of as the symbol of surgery, the knife is used less than most of the commoner instruments. It is smooth, with no crevices, it touches tissues lightly, and with it hard pressure is never made. Surely one would not prefer any method to be employed at the expense of sharpness, since dull knives produce ragged wounds—a predisposing element to sepsis. No risk must be taken, however, to break the chain of an otherwise faultless technique, and our efforts should be directed toward securing proper sterilization with the least effect in dulling the edges. Perhaps there is no plan worth the mention which does not to some degree impair the cutting edge of a knife.

I have approached a solution of the question in two ways: first, by endeavoring to ascertain what methods are now in use by the representative surgeons of this country, and to evolve, if possible, a majority report which would clear the situation; and, secondly, to actually employ the methods and to test them by experiment, both theoretical and practical.

With a view of determining the consensus of opinion, I have recently sent to a number of operators scattered over different parts of the United States the following inquiries: 1. How do you sterilize your knives and scissors? 2. What method has the least effect in dulling their edges? To these I have received fifty-one replies, an analysis of which is

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pertinent to our topic. Practically all of the answers indicate unanimous agreement upon boiling the scissors along with the other instruments. We can, therefore, dismiss this from further consideration. Of the fifty-one operators, twenty boil their knives for periods ranging from one-half minute to twenty minutes; two subject them to dry heat, and twenty-nine employ chemical agents entirely, chiefly carbolic acid, alcohol, or both. Much variation is noted in the details. Of those who boil the knives, five did not specify the time; four let them remain for five minutes, two for three, and two for ten minutes; while there were two advocates for one-half minute, and one each for one, two, six, fifteen, and twenty minutes, respectively. Of the twenty-nine who depend on chemical disinfection, ten use carbolic acid alone, five being committed to the 95 per cent. and an equal number to a 5 per cent. solution; eight use alcohol alone, some preferring a simple scrubbing, others immersion; seven use both carbolic acid and alcohol, four of these specifying the pure acid. The four remaining could not be classified. One of them employs a "2 per cent. solution of lysol in alcohol when in doubt, but otherwise relies on mechanical sterilization by immersion in sterilized water and wiping dry with plain sterilized gauze;" another wipes knives with aclohol and places them in a 3 per cent. formalin solution; the third soaks them in pure creolin for five to ten minutes, while the fourth puts them in a "solution of lysol, sometimes alcohol."

It will be seen, then, that a large proportion of surgeons are abandoning the sterilization of knives by boiling, presumably because they find that it unfits them for use. Each year they are doing less and less to their cutting instruments, and yet no one is able to trace any trouble to unboiled knives. On the other hand, one distinguished operator goes so far as to say that boiling knives for three to five minutes does not dull them. Others are content with sending them to be ground after each operation—easy for those who are accessible to instrument makers, but more difficult and

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expensive for those in the smaller towns and country. If, however, it were necessary to boil knives, such obstacles should not stand in the way. The fact that twenty-nine surgeons out of fifty-one do not boil their knives at all is an indication that other methods have been found reliable.

Now, I am not prepared or inclined to discuss the effect of heat upon the edge of a knife or upon the metal of which it is made. It is a general belief that the so-called temper of a blade is impaired by heat in any form. How this is brought about we will not stop to enquire; but it seems reasonable to state this as an evident proposition. Instrument dealers have told me that boiling ruined knives more surely and quickly than either steaming or baking them. Two others said that the usual 1 per cent. carbonate of soda solution was especially hard on cutting instruments, and this in the face of the fact that among my correspondents fifteen out of the twenty who boil knives use that solution. Another, who was for years with one of our largest manufacturers, has stated that wrapping cotton around the knife blade before placing in boiling water was very destructive to the temper, because it concentrated a greater degree of heat immediately around the cutting edge. Recently a further objection to the cotton wrapping was suggested by another dealer, who thinks that the knife is often dulled by drawing the blade through the cotton in removing it. Some protective, however, is needed if the knives are thrown in carelessly with the other instruments, for their edges are sure to be injured. To obviate this many surgeons boil their knives separately. About two years ago, my friend, Dr. Stuart McGuire, of Richmond, Va., devised a knife-holder, consisting of two pieces of aluminum held together by screw bolts, between which two scalpels can be inserted and fastened. This protects their edges and in the holder they are then boiled along with the other instruments.

To determine the effect of the various methods of sterilization, the following experiments were made: Four new

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scalpels just from the shop, whose edges were inspected and found perfect, were each subjected to one of the plans of disinfection commonly in use. The first one was placed in pure carbolic acid for ten minutes; the second in a 5 per cent. carbolic acid solution for ten minutes and then sponged with alcohol; the third in 95 per cent. alcohol for ten minutes; the fourth was boiled in soda solution for five minutes. The cutting surfaces were carefully guarded and each was examined in turn under the low power of a microscope. The knife showing the least damage to its blade was that one treated by immersion in alcohol for ten minutes, number three of the experiment. The saw-teeth were more regular, the steel was smoother, and there were no dents or fissures. Next came the 5 per cent. carbolic followed by alcohol sponging; then the pure carbolic acid, and, finally, the one which was boiled exhibited the greatest impairment of its edge—irregular notches and a loss of polish. My practical experience also tallies with the foregoing, for I find that I can use a scalpel for a longer time without sharpening when it has been simply immersed in alcohol for ten minutes preceding each operation.

We are, therefore, warranted in drawing the following conclusions:

1. Knives can be safely sterilized by chemical means without the use of heat in any form.

2. The majority of American surgeons are using carbolic acid or alcohol, or both.

3. Immersion in 95 per cent. alcohol has the least and boiling the most effect in dulling the edges of a knife.

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PELVIC INFLAMMATION.

A DISCUSSION OF ONE OF THE MOOT QUESTIONS RELATING THERETO.

By L. H. Dunning, M.D.,
Indianapolis, Ind.

The purpose of this brief paper is to endeavor to show what I believe to be an error, on the part of the authors of a considerable number of recent American text-books upon diseases of women, in not presenting a systemic description of pelvic inflammation.

Of such books, published during the last few years, but few of them recognize or describe pelvic inflammation as a distinct disease presenting a clear and well-defined clinical picture, running a more or less uniform course, presenting distinctive physical signs and terminating in various ways, but in each case having a termination that may be predicted with considerable accuracy by one watching its progress from day to day. Probably the nomenclature of the disease is faulty, and its varied terminations have been important factors in its elimination from text-book treatment; but it is more probable that the lack of a clear and comprehensive definition of the disease has been the most potent factor in its disappearance from recognition. The writer is aware that there are those whose statements we deem authoritative who deny the very existence of such a disease, and who state that the employment of the term pelvic inflammation leads to confusion and error. To them it seems to appear more rational to break up the complex disease into its com-

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ponent parts and describe each separately; as salpingitis, ovaritis, pelvic peritonitis, and pelvic cellulitis. Such authors refer incidentally only, if at all, to the fact that these lesions, as a rule, in the acute stage are so universally and closely associated that during the first few days of their progress it is impossible for the most skilled diagnostician to determine which structure shall in the end show the dominant lesion. Here is where I think the error lies, for as a clinical teacher I have for many years searched for the purpose of demonstration for a case of acute infective salpingitis, existing as a separate and distinct disease without the presence of ovaritis or pelvic peritonitis. My search has not been fruitful, for while I have found many hundred cases of acute inflammation of the pelvic tissues in which the endometrium, the Fallopian tubes, the ovaries, and the pelvic peritoneum, and not infrequently the pelvic cellular tissue also, have been simultaneously involved in the inflammatory process, I have seldom if ever found an example of an acute infective salpingitis alone. The same is true, though not to so marked an extent, in reference to acute septic ovaritis and pelvic peritonitis. I have observed quite a few cases of pelvic cellulitis and cellular abscess following abortions and labor without the presence of salpingitis, etc.; a few cases of acute pelvic peritonitis with salpingitis and ovaritis. In the light of these findings what must I conclude? That in pelvic infections we find as a resultant a complex lesion involving simultaneously the endometrium, Fallopian tube, ovary, and pelvic peritoneum, and frequently, too, the pelvic cellular tissue and in exceptional cases the bladder, rectum, a part of the omentum and small intestines also. I shall say, then, that pelvic inflammation is a complex lesion involving in an acute inflammatory process tissues of a widely different histological structure, viz., the endometrium, the Fallopian tubes, the ovaries, the pelvic peritoneum, frequently the pelvic cellular tissue, and occasionally the rectum, bladder, portions of the omentum, and coils of small intestines also.

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The usual starting place of this inflammation is in the endometrium. From thence it spreads by continuity and contiguity, by contiguity alone, or by the way of the lymphatic or vascular system to the structures beyond, already mentioned. That the disease may occasionally result from a spread of an infective inflammation from the peritoneal cavity, as in suppurative appendicitis, there can be no doubt. In such a case the area of inflamed tissues may be more localized and the pelvic cellular tissue seldom involved, and more seldom the edometrium is involved. In a small percentage of cases the Fallopian tube may be the seat of the primary lesion. Here again the pelvic cellular tissue and the endometrium are not very prone to become involved in the inflammation.

In all these instances, from whatever tissue the lesion may spring when well under way, the disease will present a more or less uniform clinical picture. All gynecologists have seen it almost numberless times. In a brief outline I may say that as a rule pelvic inflammation is ushered in by a chill followed by fever, pelvic pain, backache, vesical and rectal tenesmus, and general malaise. There is extreme nervousness, frequently nausea and vomiting, and frequently, too, distressing headache.

The physical signs are distinctive. They are rigidity of the abdominal muscles in the hypogastric and inguinal regions and marked sensitiveness to pressure in the same regions. The vaginal touch reveals, after the first two or three days and continuing from ten days to two weeks in favorable cases, a fixed uterus, induration of the tissues in the vault of the vagina, with exquisite tenderness on pressure.

In the non-suppurative variety of the disease at the end of ten days or two weeks resolution is well under way, and the induration begins to disappear or becomes localized. Heretofore no reasonable palpation could locate the tubes and ovaries. Now they are found as tender, swollen, and agglutinated masses upon either side of the uterus or in the

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cul-de-sac. A little later, if resolution progresses, the uterus has become movable, the appendages less swollen, and the tenderness has nearly or entirely disappeared. Possibly adhesions have formed, binding the uterus in an abnormal position and fixing the appendages in the cul-de-sac.

If the case be a suppurative one, the Fallopian tubes are, in the end, the most persistently involved. The case is in every way more grave, yet the most acute diagnostician could not at the outset determine that the lesion would be accentuated in the Fallopian tubes, and that they would finally be distended by pus. Just at this point I have several hundred times instituted surgical intervention, finding one or two pus tubes, a thickened, inelastic pelvic peritoneum, and a swollen, œdematous, or suppurating ovary.

Now, if in this brief and very incomplete description of the course, symptoms, and physical signs of pelvic inflammation I have been true and accurate, I have presented a picture that you have often looked upon. What shall we name the lesion? Certainly not salpingitis nor ovaritis nor pelvic peritonitis.

Many of the authors of fifteen or twenty years ago called it pelvic inflammation. The name has gone around the world and become a part of our medical nomenclature. The writer is satisfied with it, if it can be understood to mean the definite lesion he has endeavored to describe. Sometimes we have seen the pelvic peritonitis and cellulitis so extensive and other organs and tissues also involved, such as the bladder and rectum, portions of small intestines that have become adherent to structures within the pelvis, and also portions of the omentum, that the writer thinks the word diffuse has been properly added in such cases, and the name of this complex lesion has been denominated diffuse pelvic inflammation. Again, in some of the milder cases it is recurrent in type, so that it seems to the writer that it is appropriate to call the lesion recurrent pelvic inflammation. Ordinarily the name matters little, but the truth is all important.

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If we would understand the inflammatory lesions of the pelvic reproductive organs we must first study them in their associated relations, and finally the inflammatory lesions of the component parts.

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A TYPICAL CASE OF TUBERCULOUS PERITONITIS.

By W. P. Manton, M.D.,
Detroit, Mich.

In 1862 Spencer Wells stumbled on a discovery of no little importance. In operating for a supposed thin-walled ovarian cyst he opened up a peritoneum "studded with myriads of tubercles." The patient recovered, and twenty years afterward was in robust health.

In spite of this positive demonstration of the curability of at least one form of peritoneal tuberculosis made more than forty years ago, surgeons have been slow in appreciating the significance of the fact then made plain, and it has been only within the past few years that the subject has received deserved attention. Even now, out of the mass of literature devoted to the discussion of tuberculosis in general, comparatively few articles have appeared which deal with this particular location of the disorder. This apparent neglect of investigation of the peritoneal manifestations of one of the most serious of the germ diseases, and one which is amenable to surgical treatment as are few other forms, may possibly be explained by the fact that typical examples of tuberculous peritonitis are rarely met with.

Borschke, in 226 cases examined at the Pathological Institute in Breslau, found but two instances of the disease which could be considered as of primary origin, while Grawitz and Brunn, as quoted by J. B. Murphy in his excellent monograph on *Tuberculosis of the Female Genitalia and Peri-*

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toneum, found only 284 cases of tuberculous peritonitis in 13,422 autopsies.

Veit, in his paper before the Fourth International Gynecological Congress in Rome, declares that tuberculous peritonitis is always of secondary origin; and collected investigations show that the bacillus tuberculosis probably gains access to the peritoneum in one of four ways: by means of the blood, through the intestines, through the lymph channels, and by extension from the Fallopian tubes. Osler says that in adults the infection passes from the intestines in cases associated with chronic phthisis. Invasion of the peritoneum through the respiratory tract would seem to be most reasonable and possible, and the opinion is held by many observers that almost without exception this is the way by which infection is transmitted. My own investigations, however, fail to corroborate this view in the instance of the insane, among whom pulmonary tuberculosis is of exceeding frequence. In one of the State institutions with which I am connected, search fails to reveal the occurrence of a single case of this disorder.

While the first three sources mentioned must be considered as the occasional route of the infection in women, the last, extension from the Fallopian tubes, is in all probability the most frequent, and the one in which early surgical interference gives the greatest promise of curative results. Schramm found in 3386 necropsies 34 cases of tubal tuberculosis (1 per cent.), in which number the peritoneum was affected twenty-one times (61 per cent.). It is altogether probable that limited tuberculosis of the pelvic peritoneum is not as uncommon as is generally supposed, its presence being frequently overlooked in the surgical procedure of uterine and appendical ablation, and the condition being "nipped in the bud" by the operation, no further spreading of the disease takes place. Warren states that the commonest seat of limited tuberculosis in the pelvis is in the rectovaginal or rectovesical fossæ—positions in which few or ill-developed

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tubercles might easily escape indifferent or careless inspection.

Three forms of tuberculous peritonitis are described clinically: a miliary, with serous exudate; an adhesive, with the formation of adhesions and lumpy tumors on the peritoneum and in the omentum and mesentery; and a purulent ulcerative, in which the intestines and omentum are glued together, with encapsulated masses of pus and caseous material between the various coils. Of the three varieties the serous exudative is the most amenable to surgical treatment.

Just why abdominal section exercises a curative effect in these conditions has not yet been satisfactorily determined. That the peritoneum must be well opened from above has been conclusively proved; neither tapping nor vaginal section accomplishes the same result. It is altogether probable that not one but several factors enter into the curative action of the surgical procedure. Theilhaber advances the theory that in certain cases the exudate results from compression of the roots of the portal, mesenteric, and other veins by swollen retroperitoneal and mesenteric lymph glands, and that the removal of the fluid by cœliotomy gives rise to extensive adhesion formation. In these adhesions new blood-vessels are developed, and by the establishment of a collateral circulation further ascitic accumulation is prevented. This corresponds to the hypothesis advanced by Thalma in 1898 regarding the origin and effects of treatment of ascites due to cirrhosis of the liver. While possibly explanatory in certain cases of peritoneal tuberculosis, the theory will not apply in every instance, for if removal of the fluid alone is all that is demanded, aspiration or vaginal drainage would prove equally efficient with abdominal section. Moreover, extensive intraperitoneal adhesions do not occur in all cases as the result of operation, and curative action is exerted also in the adhesive and purulent forms of the disease as well as in the seroexudative form, although to a less degree. Theilhaber further states that cœliotomy exerts no

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direct influence on the tubercles themselves. However this may be, we find that operative intervention gives rise to a marked and rapid diminution in the number of the tubercles, and in all probability causes their ultimate complete disappearance. This and other points to which attetion is directed is well illustrated in the following case:

G. H., single, aged twenty-five years, entered Harper Hospital January 18, 1902. As far as known the family history is good. Previous health good, although never robust. She began having pain in the right side and back during September of the preceding year. In October she noticed that her clothing was becoming tight and uncomfortable, and discovered a general enlargement of the abdomen. Pain from this enlargement was not conspicuous. At about the same time a troublesome cough developed, there was an afternoon rise of temperature, and she suffered from night-sweats. Emaciation was rapid. The bowels were constipated and the appetite poor. Menstruation was regular, but the amount of flow was diminished. Several physicians were consulted and one of them diagnosticated enlargement of the liver and applied fly blisters, the marks of which are still present.

Status Præsens. The patient is a brunette of medium height, and is considerably emaciated. Heart and lungs normal. Liver very slightly enlarged. Morbidly sensitive, she strongly objects to any but the most superficial examination, so that this is exceedingly unsatisfactory and of little value in determining the nature of the condition present. The abdomen is uniformly distended to about the size of an eight months' pregnancy, with slight bulging at the sides. Fluctuation is marked over the entire surface. With the patient on the back there is dulness over the entire front of the abdomen, with moderate resonance at the sides.

Change of posture does not modify the percussion sounds. Vaginal examination refused. Per rectum little is revealed; the uterus is anterior and a thickening is noted in the right

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fornix. The temperature was high (101.3°) and the pulse rapid (116), but this was thought to be due to the fatigue of the long journey which the patient had just taken. By the next day both pulse and temperature had somewhat subsided.

Operation, July 19, 1902. Abdominal walls moderately thick. Median incision three inches long. Peritoneum greatly thickened and of a dull-red color. On opening the sac two gallons of a pale-yellowish fluid escaped. Inspection showed the appendages, the posterior wall of the uterus, the appendix and intestines, and the pelvic and abdominal peritoneum, as far as the eye could see and the fingers touch, to be thickly covered by miliary tubercles of a reddish-gray color. So closely set in most places were these growths that the finger-tip could hardly touch the peritoneum without coming in contact with them. No enlarged lymphatic glands were found. The Fallopian tubes were considerably enlarged and slightly adherent. The uterus was small and apparently healthy. The intestines were matted together and lay high up against the vertebral column. The appendages and appendix were removed, the abdomen flushed out with two gallons of warm saline solution, a glass drainage tube placed, and the abdominal wound closed. The patient made a good but somewhat protracted recovery, and left the hospital in excellent condition during the fifth week following operation. Examination of the fluid withdrawn from the abdomen, by the Detroit Clinical Laboratory, showed it to be albuminous in character, with a specific gravity of 1025. No tubercle bacilli or other bacteria were present. The ovaries, tubes, and appendix removed were submitted to Dr. Heneage Gibbes, who reported as follows:

Ovaries. On the surface of the ovaries are numbers of miliary tubercles, and where the section has been made through one or more of these it is seen that they are clearly superficial and do not penetrate into the substance of the ovary. For the most part, they are not even closely attached to the organ, but only at one or two points can direct attach-

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ment be made out. In some parts these tubercles are in a single layer only, but in others there are three or four in the width of the mass. Each tubercle is composed of the typical structures, one or more giant cells, and a reticular tissue. Between the individual tubercles, where they are in more than one layer, there is a fibrous tissue arrangement around each tubercle. This is rather unusual. At the point of contact of the tubercles with the ovary the germinal epithelium is absent, but the stroma of the ovary and the small Graafian follicles are unaltered.

The ovary itself is the subject of degeneration to some extent. There are masses of hyaline material and tortuous bands of the same in the matrix.

Fallopian Tubes. The arrangement of the tuberculous growth differs entirely in the Fallopian tube. Here it occurs in two positions, in the lumen of the tube and on the surface of the broad ligament. The lumen of the tube is almost occluded by a tuberculous growth consisting of small tubercles, which have almost entirely displaced the normal folds; small portions of these can be seen in the tuberculous mass covered with columnar epithelium.

The tubercles themselves differ also from those on the surface of the appendix and ovary. They contain one or more giant cells like the others, but the groundwork differs, being in the tube composed of large cells which stain faintly; they seem to be undergoing some degenerative process. On the surface of the broad ligament the miliary tubercles occur for the most part singly, and resemble those on the ovary and appendix. The *tubal growth gives the impression of being older and having passed its prime.*

A number of sections from these organs were submitted to different staining methods for a considerable time, and were then examined most carefully for tubercle bacilli, but not a single one could be found in either of them.

Appendix Vermiformis. Miliary tubercles are found all over the surface of this organ. They are about the same

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size as those on the ovary, and each one contains a relatively large giant cell in the centre. They are more solitary than on the ovary, but are situated with the same relations. As far as can be made out they are not in the structure of the organ, but on the outside of it, and, further than this, they are on the outside of the peritoneum looking from the appendix, but of course within the peritoneal cavity.

At the hiatus in the muscle coat where the mesoappendix is attached these tubercles occur on either side of this fold and are here considerably farther from the appendix than in other parts of its periphery.

NOTE.—This hiatus is not constant throughout the length of the appendix; in many places there is a perfect circular and longitudinal muscular coat.

On July 16, 1903, the patient returned with the following history: Soon after leaving the city the wound had opened slightly at its upper angle and discharged a small quantity of serous fluid. Later, the discharge became dark brown in color and had a distinctly fecal odor. Two weeks before, the seeds of berries which she had eaten were said to have passed through the opening in the scar.

Operation, July 20th. On opening the abdomen for the second time marked changes were found to have taken place within the serous sac. The peritoneum was still somewhat thickened, but much less so than at the operation six months before; its color was approximately normal. The intestines now occupied their normal position, and were slightly attached to the region of the former scar. Fine cob-web adhesions extended from coil to coil, but no firm bands were present. The omentum contained no nodular growths. There was no free fluid in the abdominal cavity. Most strikingly noticeable was the change in the number and appearance of the tubercles. Some of these were still seen and felt irregularly scattered over the abdominal and intestinal peritoneum, but where thousands had existed before only a few separated growths were now left to mark the site

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of their former abundance. The tubercles were inconspicuous and of a grayish color. Unfortunately a specimen for histological examination was not removed. The fecal fistulous tract was dissected out and its lower end closed by sewing over with eye silk. This point was covered with a square of Cargile membrane, and a strip of the same material was placed under the abdominal wound before closing. The patient was slow in recovering and, the skin edges of the abdominal wound suppurating, they were again refreshed and brought together by sutures on August 10th. The patient was finally discharged in good condition September 7, 1903.

April 18, 1904, patient again seen. She is in excellent health, has good color and rosy cheeks, and has put on flesh. The cough has about disappeared. The abdomen is flat and there is only slight sensitiveness to pressure over the left iliac region. At the middle of the puckered abdominal scar is a pinhole opening, now capped over, which she says at times discharges a few drops of serum.

December 6th, the patient writes that she is in very good health and getting better all the time. She has put on about fifteen pounds of flesh. The cough has entirely ceased.

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A CASE OF EXTENSIVE EMBOLIC GANGRENE: WITH REMARKS UPON THE INDICATIONS FOR MULTIPLE AMPUTATIONS OF THE EXTREMITIES.

By Maurice H. Richardson, M.D.,
Boston, Mass.

Some ten years ago a freight brakeman on the Boston and Maine Railroad was thrown from a car to the rails on a drawbridge over the Charles River. The train was moving slowly. He struck the track, and, to keep from falling into the water, threw one arm over the rail, where it was crushed by the wheels of the following car. Not realizing quickly enough that he had better fall into the water with one arm intact than with both crushed, he tried to cling to the bridge by throwing over the other arm, which the train immediately passed over. Then the thing which he had tried to prevent necessarily followed: he dropped at once into the river with both arms crushed. Many men would have done instinctively what he did in the few seconds given him for thought. He was rescued and brought to the Massachusetts General Hospital, where I amputated one arm near the shoulder joint and the other near the wrist. This man was awarded some thirteen thousand dollars by the Railroad. He squandered the money in riotous living and drunkenness, which caused his death in the course of a year.

A long time ago the son of a prominent physician in Boston was run over while playing on the railroad tracks, and lost both legs. Being young, he was very successful in learning the use of artificial legs. He has been able to ride a bicycle,

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to play base-ball and other active games, and to enjoy life almost if not quite as well as other boys.

A physician in Lynn told me recently that, as a student, he was asked by Dr. Bryant, of New York, to observe the gait of a man running across the amphitheatre, and to say which leg was artificial. The student was unable to tell. Then Dr. Bryant demonstrated that both legs were artificial.

Some years ago, after prolonged and careful study, I tied the femoral artery for aneurysm of the right popliteal in a man with double popliteal aneurysm. The leg became gangrenous, and amputation was performed. The question then arose as to the treatment of the other aneurysm. Digital compression and other non-operative measures were seriously considered. Many palliative measures had been tried, but no other course seemed open than ligation of the other femoral. Whether the patient preferred to suffer from the aneurysm untreated, or whether he, on other grounds, refused to run the risk of a second amputation, I never was able to find out, for I lost sight of him. The dilemma was certainly a serious one.

The question of multiple amputations in the surgery of the Accident Room is easy of solution, for in most cases the matter has already been settled by the accident itself, as in the first case mentioned. In non-traumatic cases, however, several interesting considerations arise when it is proposed to amputate one or more extremities. The subject seems perhaps hardly worthy a place on the programme of this Association, and yet the questions with which it deals are likely to arise in the practice of any active surgeon. When a case like the one upon which this paper is based presents itself, the surgeon may feel in grave doubt as to his duty, especially when he is confronted—as I have been—by marked opposition and by sharp criticism on the part of influential friends of the patient.

Some of the questions which arose in connection with this subject are:

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1. What constitutes the pleasure and satisfaction of mere animal life?

2. Who besides the patient is to decide the question of the desirability of a prolonged but maimed life?

3. What is to be the limit of prolonging life at the expense of limb?

4. What has the physician to do with questions of pleasurable or of painful existence, provided he can help to maintain the mere spark of life?

If the physician feels justified in preserving life at the expense of one leg, is he justified in preserving life at the expense of both legs? And if he feels that duty requires the amputation of both legs, will he still feel justified in amputating for the same end both legs and an arm; or, in a perfectly conceivable emergency, in preserving life at the expense of both arms and both legs? Would the principle of prolonging life at the expense of the limb still be reasonably maintained?

The following case seems to me to present features of considerable pathological interest. It is an example of the importance of the questions raised in the foregoing cases:

Margaret S. (*S. H. R.*, vol liv. p. 160), aged sixty years, married, a seamstress, I saw on February 28, 1902, with Dr. E. A. McCarthy, of Cambridge.

The family history was good. The patient had had in childhood scarlet fever and smallpox. In the middle of March, 1902, she was seized with cramps and numbness in both legs. The right leg within a few hours recovered normal appearance and sensation; but the abnormal condition of the left leg persisted. For several weeks she had been suffering from dyspnœa, and she had had palpitation of the heart. There was marked pallor of the face, and her general condition and appearance were not good. There was a systolic murmur transmitted into the axilla. The pulse was weak, irregular, intermittent. The left leg below the knee was enlarged and painful. The vessels in the calf

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were blue and cord-like. The leg was totally necrotic from the ankle half-way to the knee. The femoral pulse was perceptible to the apex of Scarpa's triangle.

On the 18th of March I amputated the left thigh. The femoral vessels at the level of the amputation were firmly plugged by thrombi.

Soon after the amputation of the left thigh, this patient began to complain of pain in the right foot, which on March 21st was mottled and purple. No pulsation could be detected in the tibials or in the popliteal arteries, though the femorals were pulsating vigorously.

On the 22d of March the right thigh was amputated. The femoral vessels were found plugged with thrombi.

The patient made a good recovery from the amputation of the right thigh, and she was very comfortable.

The changes in the left foot were preceded by an attack, on March 30th, of sudden pain and distress in the epigastrium, followed by numbness of the right arm. No radial or brachial pulse could be detected. The hand was pale and cold. There was no discoloration of the skin.

This patient was a favorite seamstress among the ladies of Boston, and she had therefore many influential friends who were deeply interested in her case. The ethical question which arose was, in my experience, a new one—namely, whether the surgeon is ever justified in refusing to prolong life, when there is every reason to believe that life can be prolonged indefinitely. I have many times amputated the thigh for gangrene of the toes, and the patients have enjoyed years of life thereafter. Indeed, I know of no more satisfactory operation in certain cases than a high amputation for gangrene of the foot. Mrs. S. had a husband, children, a good home, and, as I say, many devoted and influential friends. There was every reason for the first amputation. The only bar to good health was the condition of the heart, and that was no serious bar, for it seemed clear that the cardiac source of the embolus depended upon some acute temp-

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orary condition there—a temporary loss of force which permitted the formation of the embolus.

There was some little criticism of the first amputation. The friends of the patient asked me why it would not have been better to let her die. I replied that the first duty of the physician was the preservation of life, under all circumstances, and the second duty was the relief of suffering. In the case of this patient, by the amputation we preserved her life and we relieved her suffering. When, a few days after the amputation of the left thigh, the right leg showed symptoms of beginning gangrene, the objections to further operation were still more strongly expressed, although I did not hear of them until later, and then indirectly. There was great pain in the foot. The woman's general condition was good. The thigh was small; the shock would evidently be trifling. I therefore decided to amputate the right thigh, and this operation was performed on the 22d of March, four days after the first amputation. The patient survived the operation, which was a rapid one, and the stump followed a very favorable course of healing. The criticisms of the first operation became tinged with indignation when the second operation was performed, although the friends of the patient were friends of mine, and had been, in my early general practice, my patients. I could reply to this criticism only by saying that I agreed that the patient would be better dead than alive. After the loss of both legs she would, of course, require a constant attendant. It seemed to me, however, that I had fulfilled the two chief duties of the surgeon—I had relieved her pain and I had prolonged her life.

The ethical objections to the second amputation I appreciated as well as anybody else—perhaps even better than the lay friends of this patient. I nevertheless believed, and I still believe, that the course which I took was the right one. As I say, the patient made a good recovery from this amputation, and was entirely relieved of her pain. When, however, after an attack of precordial pain and distress, changes began

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to take place in the right arm, and the question of further operation came up, even I began to wonder whether my duty toward this patient had not been, if not fulfilled to the utmost, at least fulfilled to a reasonable extent. One can imagine that life might be tolerable to a patient without any legs; but it seemed to me questionable whether, under any circumstances, life could be worth living to a patient who had lost both thighs and the right arm. The ethical question was rapidly being settled by *reductio ad absurdum*. After the loss of both legs and the right arm, what if the left arm should become gangrenous?

The patient continued to retain her strength and cheerfulness to a remarkable degree. When it appeared likely that there would be gangrene of the arm and that another operation would be considered, the friends expressed very strong indignation. Although I sympathized very deeply with the patient, and also shared in the feelings of her friends that it would be much better for her to die, yet when it seemed likely that the arm would become gangrenous, I thought that the wishes of the patient should decide, as they had in the two previous operations.

Fortunately the question of amputating the arm never arose, for the hand rapidly regained its normal condition. By the 1st of April a feeble radial pulse could be detected. On the 17th of April an embolus lodged in the brain, and on the 18th of April the patient died. This event had been much desired by everybody, except perhaps the patient, and rendered unnecessary the consideration of any further operating.

At the autopsy the anatomical diagnosis was as follows: (1) mitral stenosis; (2) hypertrophy and dilatation of the left auricle; (3) thrombosis of left auricular appendage; (4) embolic thrombosis of right axillary artery; (5) hemorrhages into the basal ganglia on the left side; (6) multiple infarcts of the spleen and kidneys; (7) obturating thrombosis of the left common iliac and external iliac veins; (8)

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infarcts in the left lung; (9) ulcer of the duodenum; (10) hemorrhage into small intestine; (11) malformation of left common iliac vein.

In this case the patient was anxious to live—so anxious, indeed, that she submitted gladly to the first and to the second amputation. She was rendered thereby absolutely helpless and forever dependent upon uninterrupted external assistance on the part of those who might not be prepared always to grant it. Yet the mere pleasure of living would be much greater than if she had been paralyzed below the waist. Indeed, the destruction of both lower extremities—even amputation at both hips—would have left her much better prepared for a comfortable existence than a broken back, or disease of the cord attended by vesical paralysis and incontinence of feces. The patient deprived only of legs, unable to stand or to walk, is incomparably better fitted for a pleasurable existence than the bedridden patient with paralyzed sphincters. I have seen many cases of broken back and of spinal disease in which the patients have nevertheless lived for many years an extremely comfortable life. Their happiness, to be sure, was dependent largely upon their ability to be well taken care of. One patient in particular, with the paralysis of Pott's disease, is able to enjoy life in every way in which personal locomotion is non-essential. We can therefore answer the first question by saying that the pleasure and satisfaction of mere animal life may not be hopelessly impaired by inability to walk, or even to stand. One has not only intellectual pleasures, but the physical pleasures of unimpaired arms and trunk. Existence without legs and with but one arm may be conceivably worth maintaining. To carry the case a point farther, however, and to remove the remaining arm, seems a *reductio ad absurdum*. And yet there then remains the life of eating, drinking, and sleeping, with the highest enjoyments of life—the purely intellectual. And what greater satisfaction can anyone get out of life than those of animal existence and intellectual enjoyment? He can get

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only the pleasure of helping himself and of using his own arms and legs. If he is able to procure from others sufficient assistance, he can still enjoy much. If he is not able to call upon others to supply the defects of his body, he must perish helpless. The environment of the patient and his ability to take from others the forces of which he has been himself deprived—these things have an important bearing upon the question.

But assuming that the patient is poor and friendless, has the surgeon even then the right to refuse him life and relief from suffering? He has no such right, I maintain—no more right than the community has to leave uncared for the hopeless paralytic or the hopelessly insane, or even the hopeless consumptive.

If one can conceive of a state of things in which one limb after another is removed successfully and there remain but the head and trunk, with what degree of satisfaction can the surgeon contemplate his work? Is the surgeon to assume that he is the one to decide? Is he to take upon himself the responsibility of refusing an operation which will maintain an existence in the enjoyment or in the sufferings of which he has no immediate concern? If it is not the duty of the surgeon by his operation to preserve life at no matter what cost of immediate and subsequent pain, why is it not the duty of the surgeon to destroy life in the prevention of hopeless and unendurable pain. The physician is not justified in causing a painless death to relieve extreme and hopeless suffering, and yet there are probably few physicians who have not seen many cases in which a painless death would be welcomed by patient and by friends. Many years ago a patient in the greatest agony of dyspnœa from the pressure of an enormous and hopeless recurrent cervical tumor for which he was being given hypodermic injections of morphine, begged the physician to give him a fatal dose. The physician, a man of the highest, the strongest, the most upright character, complied. For the sake of humanity he defied laws and conventionalities.

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Who can say that he really did a wrong? Few of us would have the determination and the strength of mind deliberately to incur so great a responsibility and so manifest an infraction of the laws, and yet no man in his heart can deny that the right thing was done. I dare say many men would have attempted the removal of this tumor in the hope that the operation would mercifully be unsuccessful, for breathing was possible only by the continuous lifting of the tumor from the trachea by an assistant. In cases like this the patient begs for death. It is denied him.

Are we justified, on the other hand, in refusing surgical aid when the patient is willing to purchase life at the expense of many operations and much suffering, and the loss even of every limb? In my opinion we are not justified in refusing operation even under these circumstances: we are as firmly bound by the unwritten law to preserve a life that asks to be spared as—in the opposite extreme—we are, by the written law, to maintain a life that begs to be destroyed. No one but the patient is to decide the question of the prolonged but maimed life. There is no limit in prolonging life at the expense of limb, and it seems to me that the physician has nothing to do with questions of pleasurable or of painful existence, providing he can help maintain the mere spark of life.

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GUNSHOT WOUNDS OF THE STOMACH.

REPORT OF TWO CASES.

By W. M. Jordan, M.D.,
Birmingham, Ala.

Much has been written in recent years in support of the non-operative treatment of gunshot wounds of the abdomen, statistics being brought forward to show that better results are obtained by this method than by operative treatment. These statistics, which are based upon reports of army surgeons on duty at the front, are said to be misleading in some respects, but this is a question which civilian surgeons are not competent to pass upon. It is certain, however, that the army statistics relating to abdominal wounds are of no value as applied to similar wounds received in civil life. The wounds of war are usually inflicted by small-calibre, steel-jacketed rifle bullets of high velocity, which produce correspondingly small wounds with clean-cut edges, whereas the wounds of civil life are commonly produced by soft-lead pistol bullets of low velocity. The resulting wound is more or less lacerated, and is of larger size than that produced by the army bullet.

When the stomach or intestine is perforated, the mucous membrane prolapses into the wound and may plug it completely if the wound is a small one. This is nature's method of treating wounds of the bowel, but, as Klemm has shown by experiments on animals, it can only occur where the perforation is less than 0.5 cm. in diameter. A wound of this size may be produced by the small-calibre army rifle, but will

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rarely be met with in civil life. On the contrary, even when the wounds are produced by the small parlor rifle the bowel perforations are frequently of larger size than the bullet which made them. This is probably due to the tendency of the lead bullet to turn sidewise. It is thus seen that gunshot wounds of the abdomen as met with in civil practice occupy a separate class from similar wounds received in war, and are not to be governed by the same rules of treatment. Whatever may be the practice among army medical men, in civil life it should be a fixed rule to operate for all cases of gunshot wounds of the abdomen.

If a wound of the stomach is suspected, the incision should be made near or through the skin wound, as it is likely that the stomach wound will be found directly under it. If this is the case it will save much harmful handling of the organ. The stomach is not able to change its position materially, as the intestine is, and hence the perforation will be found close to the point where the bullet entered the abdominal wall. There are usually two perforations, a wound of entrance and a wound of exit. The wound of entrance is nearly always on the anterior surface, but the wound of exit may be either on the anterior or posterior surface, depending upon the direction of the shot and the position of the stomach at the time of the injury. There may be only one perforation, as in my first case, and in a case reported by Williams in the *Boston Medical and Surgical Journal*, and quoted in *Progressive Medicine* for June, 1904. This occurrence may be explained on the supposition that the bullet struck the stomach on the edge of a fold.

The wound of entrance having been located and closed by suture, the remainder of the anterior surface is gone over in the search for the wound of exit. It should be remembered that not infrequently the wound of exit, as well as the wound of entrance, is on the anterior surface, and failure to observe this detail may result in useless exploration of the posterior surface, as in my second case. If the wound of

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exit is not found on the anterior surface, the gastrocolic omentum is incised and the posterior surface explored. If the wound is near the lesser curvature it can be better exposed by opening the gastrohepatic omentum. The presence of a perforation on the posterior surface constitutes a positive indication for drainage of the lesser cavity of the peritoneum. Drainage is here indicated, not so much on account of the stomach wound as on account of probable injury to the pancreas or left kidney. In other words, the wound of the posterior wall of the stomach is taken as presumptive evidence of injury to these organs. Positive evidence to the contrary can scarcely be obtained at the time of operation.

For closing perforations of the stomach I would recommend the purse-string suture. Objection has been urged against its use in closing intestinal wounds, on the ground that it may constrict the lumen of the gut, but this objection cannot apply to wounds of the stomach. The great advantages of this suture are the rapidity with which it can be applied and the strength of the closure. It is well to reenforce the first suture with a second one, to add strength as well as to increase the area of approximated surface.

If the stomach is full at the time of operation, it would be well to siphon out its contents by means of a tube passed through the bullet wound. This procedure would no doubt add to the safety and comfort of the patient, and could be more conveniently carried out than could ordinary lavage of the stomach.

The after-treatment of stomach wounds is extremely important, its main object being to limit peristaltic action. Hence, nothing whatever should be given by the mouth during the first week, the patient being sustained in the mean time by nutrient enemata. In this connection the fact should not be forgotten that the stomach does not absorb water to any appreciable extent. Water is therefore contraindicated in the first few days after operation, as it must excite peristalsis in order to leave the stomach. The needs

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of the patient may be supplied by rectal and subcutanous injections of normal salt solution. One of the cases reported below got all of his water in this way for six days.

Morphine is useful in the first few days after operation. The benefit following its use is due not only to its inhibitory influence over peristaltic movements, but also to its power of checking gastric secretion.

Following is a brief report of the cases:

CASE I.—J. J., aged twenty-one years, white, was shot in the abdomen with a 38-calibre pistol about 10 P.M., June 13, 1904. He was taken at once to the Hillman Hospital, where he was examined by me shortly afterward. I found a bullet wound in the epigastrium, midway between the ensiform and umbilicus. He was somewhat under the influence of alcohol, but his general condition was otherwise good. He stated that he had eaten nothing for several hours. He consented to immediate operation, and the anæsthetic was begun two hours after receipt of the injury. The incision passed through the bullet wound, and extended a short distance above and below it. On opening the abdomen a wound of the left lobe of the liver was observed, but as it was not bleeding it was not thought necessary to suture it. The anterior surface of the stomach was then examined, and a ragged perforation found near the lesser curvature. This was closed at once by a purse-string suture of silk. The gastrocolic omentum was then incised and the posterior surface explored for the wound of exit, but none could be found, nor could any other perforation be found on the anterior surface. I was therefore forced to conclude that only one perforation was present, and that the bullet had probably struck the edge of a fold, the wounds of entrance and exit being continuous. Having satisfied myself that only the one perforation was present, I re-enforced the original suture with a second suture of silk, after which the gastrocolic omentum was sutured with catgut, the peritoneal cavity flushed out with large quantities of salt solution, a

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wick drain inserted under the left lobe of the liver, and the incision partially closed. Nothing was given by the mouth for six days, nourishment being given by enema and water by rectal and subcutaneous injection. As the man was alcoholic, whiskey was added to the rectal injections. The hypodermoclysis was given once or twice daily. At the end of the first week water and liquid nourishment were given by the mouth. The drain was removed on the sixth day. Convalescence was slow, but finally ended in complete recovery, the patient being discharged in five weeks. The interesting feature of this case is the single perforation of the stomach.

CASE II.—E. B., colored laborer, was shot in the abdomen about 1 A.M., June 16, 1904. He was brought to the Hillman Hospital about 8 A.M., and I saw him shortly afterward. He had a bullet wound in the upper part of the left linea semilunaris, near the costal margin. Operation was begun at 9 A.M., eight hours after the injury was received. Under ether anæsthesia an incision was made in the upper part of the left linea semilunaris, and on opening the peritoneum a quantity of foul-smelling gas escaped. A perforation was found near the middle of the anterior surface of the stomach, and was closed by a purse-string suture of silk. Another very large perforation was found on the anterior surface, close to the cardiac orifice. This perforation would admit two fingers, and was closed with great difficulty owing to its depth. The peritoneal cavity was flushed out with salt solution, a wick drain passed under the left lobe of the liver, and the incision partially closed. The patient vomited considerable blood during the operation and was in a condition of profound shock when he left the operating table. He never reacted, and died four hours later.

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SURGICAL CASES.

By W. H. Dougherty, Jr., M.D.,
Augusta, Ga.

A CASE OF SUPRAPUBIC PROSTATECTOMY, WITH AN IMPROVED METHOD OF AFTER-TREATMENT.

L. B., aged seventy-six years, referred by Dr. D. E. McMaster, of Tennille, Ga., had been entirely dependent upon the catheter for twenty-one years. Latterly he had been obliged to resort to it every two or three hours. Its introduction gave great pain and usually was followed by free bleeding. Tenesmus was nearly constant and very distressing. Getting no respite, he had been driven to seek surgical treatment. He was very feeble and badly nourished, but heart and arteries were apparently good, and quantity of urine was abundant. I was unable to introduce into his bladder any kind of catheter, although careful attempts were made with instruments of various patterns, but by assuming a peculiar crouching posture he could usually draw his urine by means of a silver catheter which he had long used, and which barely reached the bladder when introduced to its full length.

The urine was excessively foul, and loaded with mucus and pus. The tenesmus which attended each passage of the catheter invariably caused an involuntary evacuation of feces. By rectal examination the site of the prostate was found to be occupied by a large mass, the upper part of which extended beyond the reach of the finger, and was very hard and sensitive to pressure. Above the pubis this

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same hard mass was easily palpable. It was thought that the bladder contained an immobile stone of unusual size; but if so, it was not possible by rectal touch to differentiate with any certainty between it and the greatly enlarged prostate.

The silver catheter gave no information in this direction. When introduced its point barely entered the bladder, and, moreover, its introduction gave such pain as to prohibit avoidable manipulation.

For a week after admission into the hospital the bladder was frequently irrigated and cystogen given, with some improvement in the urine as a result. The patient's general condition at the end of this time, however, was distinctly worse, with subnormal temperature, greater weakness, complete anorexia, and increasing pain and difficulty in passing the catheter. Operation was therefore advised and promptly accepted, although its gravity was fully explained.

Accordingly, on September 25, 1904, the bladder was opened by a suprapubic incision, made according to the usual technique, except that the subperitoneal areolar tissue was divided transversely until the peritoneum was identified, when this membrane was carefully detached and rolled upward. By this manœuvre the bladder wall was sufficiently bared without disturbing the prevesical fatty tissue, or making any pockets which might be contaminated by filthy urine and lead to a diffuse cellulitis. The bladder wall was only moderately thickened. The organ contained a large phosphatic calculus which was quite firmly adherent posteriorly. Upon its removal, the mucosa, where it had been in contact with it, bled very freely. This bleeding was checked by filling the bladder with a 1:5000 solution of adrenalin. Numerous small concretions, which were clinging to the mucosa, were picked off. This started another free oozing, which was again stopped by applying the adrenalin solution. The bladder was thoroughly washed out with salt solution. The vesical orifice of the urethra

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was much elevated, and was surrounded by several projecting masses of firm tissue, which were quite movable and, when lying against each other, caused a complete occlusion; the largest of these masses was about the size of an English walnut.

The prostate was removed according to the method employed by Moynihan—*i. e.*, an assistant steadied the organ by making pressure with two fingers in the rectum and the thumb against the perineum; an opening was made with scissors through the bladder wall just below the inner urethral orifice; a finger was introduced and the gland shelled out, bringing the prostatic urethra with it. This was easily and quickly done, and was attended with but little hemorrhage. The wound was then closed as follows: Provision for drainage having been made, as will be presently described, and the opening in the bladder closed, the wound was carefully mopped out with peroxide of hydrogen, and its deeper portions packed with gauze saturated with balsam of Peru. The muscles and the skin at each end of the incision were sutured with chromic catgut, leaving only enough space for the drainage tubes and projecting ends of the gauze-packing strips; a voluminous gauze dressing, through which the tubes projected, and a snug bandage were applied. Patient left the table in good condition. Convalescence was uninterrupted and satisfactory, although return of strength was naturally slow.

The after-treatment was briefly as follows: The bladder was thoroughly irrigated with saturated solution of acetozone every three hours; the patient was taken out of bed and kept on the piazza in a reclining chair nearly all of each day beginning with the second day after operation; feeding was systematic. After seventh day a soft catheter was passed into bladder through the urethra, and through this continuous drainage was maintained and frequent irrigation practised for ten days or more. The bladder was washed out at least once daily after until patient was discharged. He left the

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hospital on thirty-first day after operation. The wound was healed and he was able to hold his water for four hours without discomfort and pass it easily.

Now a word about the drainage. A satisfactory drainage in such a case should accomplish the following: 1. It should readily conduct the urine from the bladder. 2. It should prevent escape of urine around the tubes and into the wound and dressings, at least until after the wound surfaces have been protected by well-defined granulation tissue. 3. It should provide a maximum facility for keeping the bladder clean with a minimum amount of disturbance and discomfort to the patient. The plan adopted in this case, and which occurred to me "on the spur of the moment," met all these indications so very satisfactorily, and is withal so simple, that I cannot but think it deserving of further trial.

The salient points of the technique are, briefly, to use for drainage a tube sufficiently large to preclude possible obstruction by clots or thick mucus; to introduce alongside of it a smaller tube, through which the irrigating solution may be injected into the bladder; to suture the opening in the bladder wall so closely around these two tubes that leakage is prevented; after careful disinfection, to pack so much of the wound as cannot be safely closed with gauze saturated with some stimulating and mechanically protecting substance like balsam of Peru. The large tube should extend to the bottom of the bladder, but not touch it; the small one should be an inch or more shorter to ensure a better distribution of the solution in irrigating. The two tubes should be fastened together by a stitch, and should be anchored to the bladder wall by a stitch on each side.

In suturing the bladder care should be taken to so introduce the sutures that, when they are tightened, the bladder wall will be drawn snugly around the tubes; and after all are tied, an additional stitch should be put between the tubes, thus closing the small angles which would otherwise be left there. I used a rather pliable half-inch tube for drainage

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and a medium-sized catheter for the irrigating tube. The bladder was closed by two rows of sutures. Those of the first row entered and emerged about one-third of an inch from the edges of the incision and included all the coats of the bladder except the mucosa. The second row consisted of Lembert sutures. The effect of this mode of suturing was to invert the bladder wall around the tubes, very much as is done with the wall of the stomach in Kader's gastrostomy. Fine chromicized catgut was used. Irrigation was practised without the slightest inconvenience or disturbance of the patient; the nurse simply removed the clamp by which the catheter was kept closed, inserted into its end the nozzle of the irrigating apparatus, and turned on the solution. The escape of the solution through the large tube was unimpeded and painless, even when clots were washed out, and the dressing was not soiled or disturbed. Continuous irrigation could have been kept up had it been necessary. Furthermore, the drainage between times through the large tube was perfectly satisfactory, and required no supervision.

The wound was inspected on the 27th and found to be clean. On the 28th or 29th (the case notes do not say which) the gauze packing was apparently damp with urine. It was thereupon removed and a fresh packing, with balsam of Peru, introduced. On the 30th this was repeated.

October 1st, the sixth day after operation, oozing of urine into the wound was noticeable, and drainage through the tube began to be irregular and imperfect. The following day the tubes were removed. Subsequently irrigations were made through the catheter in the urethra, the solution escaping through the wound.

It will be noticed that for at least three and practically for five days the abdominal wound was protected against infection from the bladder. Meanwhile, excellent continuous drainage was obtained without complicated device of any kind. At the same time abundant opportunity was afforded

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for treating the cystitis and combating an intravesical infection by frequent or even continuous irrigation, without appreciably disturbing the patient or interfering with his remaining out in the fresh air.

Dr. C. W. Crane assisted me in the operation and conducted the after-treatment for me.

The drainage device above described is a modification of that of Gibson (Bryant's *Operative Surgery*, p. 1127), which, however, I did not know at the time of the operation. The difference consists in the substitution of a large tube for his smaller one (32 F.), and in using two tubes instead of one, thus ensuring greater freedom in irrigating, and in packing a part of the wound. Antiseptic irrigation is an efficient weapon in treating a badly diseased bladder, and if it can be freely employed without annoying the patient to his injury, it may be possible to dispense with perineal drainage in some cases where it is now thought to be necessary, and at the same time effect a reduction in that part of the mortality after suprapubic prostatectomy that is caused by sepsis.

I feel that an apology should be offered for presenting a device which I have used only once; but I have been led to do so by the thought that anything that has ever been found useful in dealing with a bladder is probably worth knowing.

AN UNUSUAL CASE OF INTRAPERITONEAL HYDATIDS.

The following case of intraperitoneal hydatids is reported simply because I have seen no record of one like it:

A young negro man was referred to me by Dr. J. P. Neal, of Greenwood, S. C. About two years before coming he noticed a beginning enlargement of the abdomen. This steadily increased. Latterly he had been losing flesh. He complained of nothing except the weight, which had become so great as to incapacitate him for work. Upon examination the abdomen was found to be symmetrically and very

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greatly enlarged. With the patient recumbent it did not flatten out or otherwise change shape. The abdominal muscles were tense. A perfect fluctuation wave was transmitted from one side to the other by gentle tapping. The percussion note was flat over the entire abdomen. It was noted, however, that percussion over the lower part of the sternum gave an unusually resonant note, suggesting that the stomach and intestines had been crowded into this locality. Upon this sign, chiefly, a provisional diagnosis of hydatid cyst was made. There was also an enlargement of the scrotum, like a large hernia, which had developed slowly and painlessly. The nature of this could not be made out. Upon opening the abdomen it was found to be filled to its utmost capacity with cysts, closely packed against each other and varying in size from that of a small orange to that of a mustard seed. They contained clear, straw-clored liquid. Their capsules were thin and delicate looking, but really quite strong and not easily broken. They were intimately bound to each other and to the parietal peritoneum and the viscera by a web of surprisingly strong, thread-like adhesions.

The stomach and intestines were crowded up under the diaphragm, indicating that the growth had been from the pelvis upward. The removal of the cysts, of which there were literally hundreds, was very tedious, owing to the resistant adhesions and the unusual places into which the cyst development crept. Every nook and cranny of the greater peritoneal pouch had been invaded. For example, dozens were tucked in between the diaphragm and the convex surface of the liver and about the spleen. The lesser peritoneal cavity had apparently escaped. As far as possible all of appreciable size were removed, though doubtless some were left, concealed in out-of-the-way spaces. A few, whose removal was impracticable, were crushed and their contents carefully mopped up with gauze. Dozens of minute size were distributed along the mesentery, especially in the pelvis.

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Many of these had to be left. The inguinal canal was not patulous.

An incision from the ensiform cartilage to the pubis was unavoidable. Convalescence was uneventful. Two weeks later the scrotum was opened and a number of similar cysts were removed from the cavity of the tunica vaginalis. These were submitted to microscopic examination and found to be sterile. The specimens from the abdomen which were saved for this purpose were, unfortunately, lost. The patient has remained well.

In my rather limited examination of the literature of this subject I have not found any case presenting the peculiarities of this one. Although the microscope failed to demonstrate the presence of scolices or hooklets, the growth was evidently parasitic. The cysts were certainly not endogenous, for the mother-cyst of so multitudinous a progeny could not have escaped recognition. On the other hand, their extraordinary number seems to preclude the possibility of their having been the product of a multiple infection through the usual channels. Had this man harbored an echinococcus cyst, which ruptured and discharged into the peritoneal cavity a multitude of scolices and brood capsules, a subsequent conversion of these into cysts would have produced the condition actually found. This, I think, is what really happened.

Graham, of Australia, has observed the development of small cysts, studding the peritoneum, following a leakage of fluid from an hydatid of the liver after exploratory aspiration. He mentions other cases of numerous small intraperitoneal cysts varying from the size of a pea to that of a bean, and suggests that when cysts arise from escaped scolices their development is aborted, and they remain small in consequence.

The sterility of the cyst contents in my case finds in this a probable explanation. The parent hydatid was not found, or, at any rate, recognized, although nearly every part of the abdominal cavity was both seen and handled.

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THE SIGNIFICANCE OF THE URINARY EXAMINATION IN WOMEN.

By Guy L. Hunner, M.D.,
Baltimore, Md.

A more appropriate title for this paper would possibly be "The Importance of an Examination of the Urine;" for it is my sole aim to present a simple plea for a simple examination of the urine.

The general practitioner who systematically makes an examination of the urine in cases of obscure diagnosis is an exception among his confrères. That the busy internist is not the only delinquent we can doubtless all attest from personal experience.

While most of you are surgeons and gynecologists, many of you are general practitioners as well and usually depend entirely upon your own resources for the diagnosis in a given case. For this reason I shall confine my remarks almost exclusively to the discussion of the simpler methods of examination in cases of urinary-tract disease.

I wish first to relate a few recent cases bearing on the question under discussion:

Case I.—A woman, aged forty years, was referred to me in September, 1904, complaining of pain in the left pelvis. This pain began suddenly about twelve or fourteen years ago, after the patient had received a severe wrench of the body. Her physician made a diagnosis of inflammation of the womb, and the inflammatory symptoms persisted about a week, keeping the patient in bed. Since that time the

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patient had suffered from a more or less constant pain in the left pelvis, with occasional exacerbations. No history of colicky pains could be elicited, although the patient stated that she had had "nervous spasms" on three different occasions because of the pain. She enjoyed a good appetite and good general health. There seemed to be less secretion of urine when the pains were more intense, due she thinks to the reduced ingestion of food and water. She never had symptoms referable to the bladder. On examination, the vaginal outlet was much relaxed, the uterus was of normal size and in normal position, the right ovary small and freely movable. In about the region of the left broad ligament I found a small, elongated body which I at first thought was a stone in the left ureter. On further examination, however, I found the left ovary to be a small, hard, elongated, and very movable body, and I could not definitely locate two such bodies. There was considerable tenderness somewhat higher in the pelvis in the region of the posterior brim of the true pelvis.

I could not make a diagnosis, and recommended that the patient go to the hospital for a few days to give us an opportunity to carefully go over the urinary conditions. This she consented to do, and on returning to my office three days later to make final arrangements for her room at the hospital, she remarked that I must have displaced whatever was wrong in the pelvis, as she had been entirely free from pain since my examination. This was very suggestive of a movable stone in the ureter, and I decided to use a wax-tipped bougie at once and try to determine this point. She was first prepared in the dorsal position for another bimanual examination before catheterizing. On making this examination I again found the small, hard, movable left ovary, and could easily bring it down to the ureterovesical region, where I had first suspected the presence of a stone. On palpating farther back in the pelvis, where there had been extreme tenderness on my first examination, I found what seemed to be a definite mass lying in Douglas' pouch. This

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seemed to be about the size of a small hen's egg, and was soft and very tender.

Thinking I had discovered the cause of her indefinite symptoms of pain, I gave up the idea of using the wax-tipped catheter, and sent the patient to the hospital for operation the next day.

I sent word to the interne that I would operate for a small mass in the left pelvis, but that I had suspected stone in the left ureter, and would like him to carefully examine a specimen of urine catheterized from the bladder for the presence of microscopic blood. His report was negative. Imagine my surprise to find after the patient was anæsthetized that the pelvis contained no abnormal mass! I then placed her in the knee-breast posture and passed a wax-tipped renal catheter which came back without scratch marks. I performed a posterior vaginal cœliotomy, and found a senile left ovary as before palpated, and found the left broad ligament the seat of a congeries of varicose veins, which I considered the probable cause of her indefinite symptoms. The left broad ligament tube and ovary were removed, and the relaxed outlet was repaired by the Emmet method.

Her convalescence was normal for the first three days, but at 11.30 P.M. the third day she was taken with a sudden pain in the lower left side, and this pain soon extended throughout the left side and into the left kidney region. The left side of her abdomen was board-like in rigidity, and she objected strenuously to any attempt at palpation. The next morning her urine was very bloody. For twelve days she had more or less frequent attacks of colic, and the urine showed blood constantly. The attacks of pain usually followed urination or any change of position. Both morphine and chloral hydrate were used freely the first seven days, and after that chloral hydrate was sufficient. On the twelfth day she suddenly became more comfortable after a moderate attack and she thought she passed something into the bladder. An *x*-ray photograph taken the tenth day was negative in

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the kidney region. Iodoform, persisting after our post-cervical iodoform gauze drain, clouded the pelvic picture. I saw the patient December 7th, and she said she had not had an ache or a pain since leaving the hospital. In the near future she is to have a bladder examination, and if no stone is found in the bladder an *x*-ray photograph will be taken of the pelvic region.

This case has been related to show how easily one may be misled in his diagnosis, and how important it is to carefully examine the urine in all doubtful cases. It is probable that if I had made a microscopic examination of the urine the first two visits, this would have led to an exact diagnosis, and to a curative operation. The patient's symptoms had seemed so indefinite that from the first I had intended to send her to the hospital for a few days of observation, and for this reason had neglected a microscopic examination of the urine. A good hospital and a reliable interne to lean upon are not always an unmixed blessing.

Case II.—Another patient, aged thirty-five years, was referred to me last August, her family physician thinking that she had some trouble with the right kidney. A tumor mass filled the right flank, pushing forward the lower costal margin and extending considerably beyond the linea alba at the umbilical region, and beyond the pelvic brim inferiorly. The urine contained a large quantity of pus, and on cystoscopic examination a stream of thick, yellow pus was seen to be flowing from the right ureter. By holding a speculum under the left ureteral orifice the left kidney was found to be throwing down a large quantity of normal urine. Bacteriological tests of the bladder urine showed a pure culture of the bacillus coli. After vainly searching for tubercle bacilli for several consecutive days I decided that we were dealing with either a tumor or stone in the kidney, the excessive quantity of pus making me favor the latter diagnosis. I successfully removed the largest calculous kidney I have ever seen.

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This patient had been operated upon at one of the Baltimore hospitals two years previously for a complete prolapse of the pelvic organs. According to her statement she entered the hospital because of a fulness and uncomfortable feeling in her right side. For five years she had noticed that the side seemed stiff when she would lean over a chair or out of a window, and for two years she had noticed a swelling. Notes from her history, kindly furnished me by the house physician of the hospital, state that she entered complaining of "a sickening feeling in the right flank two months before admission," and again for three weeks immediately preceding her admission. The note on her examination stated that the abdominal examination was negative. A thoroughly scientific examination of the urine is one of the features of the hospital mentioned, and I was furnished a copy of the urinary analysis. This notes an absence of blood and albumin, but states that the sediment was "profuse, white, compact," that there were "pus-cells in great abundance," few "pavement epithelial cells," and that there was "much nucleoproteid."

In view of the patient's previous history and with this urine examination, and her condition while under my care, it seems fair to suppose that the patient had a calculous kidney while under the care of my esteemed colleagues; but that, as not infrequently happens, the very prominent physical defect which was first discovered diverted the attention from the very important urinary message.

Case III.—A third case was brought to me last September at the Frederick City Hospital by a general practitioner from another city, a diagnosis of ovarian cyst having been made. The patient, aged thirty-three years, had noticed pain and a swelling in the left flank for the last four years. Eight months previously she had had a severe attack of pain in the left side accompanied by much blood in the urine. This was the only time she had noticed blood in the urine. The tumor had been growing rapidly in the past eight months.

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Bimanual examination demonstrated normal pelvic organs, and no connection between these and the tumor. The tumor seemed to be of the left kidney and I made the usual lumbar incision for its removal. On reaching the peritoneum it was opened for transperitoneal palpation of the right kidney, and then sutured. The tumor had apparently arisen in the lower pole of the kidney, and had extended through its capsule into the pelvis of the kidney, where it followed the lines of least resistance upward into the calices of the upper pole and downward into the ureter, forming a cast of this organ for a distance of 11 cm.

An exhaustive microscopic study has not yet been made, but the tumor was of adrenal tissue, and was apparently undergoing sarcomatous changes. I regret exceedingly that I did not get a catheterized specimen of the bladder urine for examination. Before hardening the specimen I prepared slides from the scrapings of the surface of that portion of the tumor which had extended into the ureter. These slides showed cells of an epithelioid type, many of them being extremely large.

The three cases above reported, occurring in my practice during the last few months, are enough to substantiate the proposition that a urinary examination is too often neglected; and sometimes when made is not carefully interpreted. To these I could add many similar observations made during a short experience in hospital and private work. I read before this society last year a paper on "Surgery of Urinary Tuberculosis in Women" (*American Medicine*, vol. vii., 1904), which was based upon a previous report of 35 cases (*The Johns Hopkins Hospital Bulletin*, vol. xv., 1904). In the earlier report I showed that many of these patients had been treated or operated upon for various diseases while suffering with tuberculosis of the kidney. Typhoid fever, malaria, la grippe, appendicitis, oöphoritis, and floating kidney were some of the diseases for which they were treated, when a careful study of the urine might have led to the true con-

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dition. I need not enter further into the details of such cases.

In the three cases above outlined we see that one (the third) had suffered for four years with pain and a palpable tumor in the left flank region, signs and symptoms that should certainly have called for a urinary examination. She had passed bloody urine and still she was not referred to a specialist until her adrenal tumor was undergoing sarcomatous changes. The first patient mentioned had an outlet operation and a vaginal cœliotomy, and probably still carries a stone, the cause of her trouble, either in her ureter or bladder. The second patient had a pelvic operation performed at a time when the more necessary kidney operation would probably have been far less serious than it proved two years later.

In a body of surgeons and gynecologists we would probably not have to go far to hear of mistakes that resulted even more seriously because of a failure to examine the urine. On the other hand, many of you can cite cases where the urine examination has proved a great blessing in clearing up an obscure condition and preventing an unnecessary operation.

Dr. L. P. Hamburger told me of such a case recently and kindly gave me the following notes:

"On November 13, 1904, I was called to see Mrs. E. S., aged thirty-one years, who was complaining of pain in the abdomen on the right side. All throughout the morning the patient had had a desire to go to stool and to void urine frequently. The movements had been formed, but the result had not been satisfactory, the desire remaining. On preparing to go out in the afternoon she was seized with a violent pain in the region of the right iliac fossa. The pain was sharp and cutting, radiating in a slight degree to the back. She had been nauseated and had vomited.

"She was seated in a chair with body flexed and feared to move because of the suffering. The tongue was clean;

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pulse 72, a little irregular in rhythm; temperature by mouth at 4 P.M. was 99°. She was put to bed with difficulty. On palpation there was great tenderness over the lower half of the right rectus, particularly at McBurney's point, and in fact throughout the lower right quadrant of the abdomen. There was slight "muscle spasm." There was no tenderness over the lumbar region. Applications of heat had been ineffectual.

"With the notion that I was dealing with appendicitis, I went to make preparations for counting the leukocytes, at the same time taking a specimen of urine for examination. To my surprise the urine disclosed albumin and, microscopically, blood. The urine was clear, with very slight flocculent sediment. After a thorough centrifugalization the sediment revealed many red corpuscles, shadows as well as crenated forms. 5.30 P.M. The pain is still intense and is now extremely severe in the back in the lumbar region. One-fourth grain of morphine was administered and within one-half hour one-sixth. Within an hour there was considerable relief."

The interesting features in this case were these: That when Dr. Hamburger first saw the patient the pain was not in the back, and that the urine was to the naked eye perfectly clear. The presence of albumin was easily detected, but it was only after a long centrifugalization that enough sediment could be collected for microscopic examination. When he returned about an hour later the pain was situated in the back also, so that a suspicion of renal colic would have been raised at this time without the urinary analysis.

I recently had a similar experience. On October 15th a physician called me to see his wife because of her suffering with severe abdominal pain. She had worked over a hot stove in the morning, and before going to market had changed her clothing in a cold room. On going about the market she was suddenly seized with a severe pain in the right flank region, and had to be carried home in a cab.

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I saw the patient at 10.30 P.M. She was lying on the right side and groaning with pain. Two hypodermics of morphine within the previous five hours, the first of one-half grain and the second of one-fourth grain, had apparently given her no relief. She had vomited food taken at noon. Her pulse was 64 and temperature normal. The abdominal muscles were rigid, but on careful manipulation and by diverting her a ention she relaxed enough to demonstrate that there was no great tenderness at any point except over the right kidney region. Diagnosis seemed to lie between a gallstone attack, appendicitis, and renal colic, with the conditions in favor of the latter. A careful blood count showed 17,000 leukocytes, and made me rather apprehensive of an appendicitis belonging to that type in which the pulse rate and temperature are not disturbed. Examination of a specimen of urine catheterized from the bladder threw the weight of evidence in favor of a kidney attack and prevented the patient from going to the hospital. The urine was scanty, high-colored, and contained a few red blood corpuscles, many hyaline casts, and about one-tenth of 1 per cent. of albumin. Not having a Paquelin cautery I applied a hot poultice over the kidney region and advised rest in bed, low diet, copious ingestion of water, and attention to the bowels. The patient improved steadily and was out of bed in about a week. The urine was examined on the third day and a centrifugalized specimen showed a few pus and epithelial cells, a few red blood corpuscles and casts. The nitric acid test failed to give an albumin ring.

Let us now consider the practical application of such facts. I do not propose to describe or urge the adoption of the many new and exact methods that are being introduced for the examination of the urine and of the urinary organs. I believe that those of us who have the advantage of surgical and medical practice in well-regulated hospitals should encourage original investigation and the trial of new methods of research. Cryoscopy, the phloridzin test, and the indigocarmine test,

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each has its sphere of usefulness, and should be used by those who have the facilities until their value and their limitations are determined. Cystoscopy and the various methods of precision made possible by its use seem indispensable to those of you who depend upon them.

But a discussion of these methods is beyond the scope of this paper. My appeal is to the general practitioner and to the average surgeon who has not perfected himself in the finer details of the work, and I wish to make my suggestions so simple and practical that there will be no opportunity for him to dodge and excuse mistakes on the grounds of inability to do the unusual.

To urge the point briefly, I would say, let us use our eyes, microscopes, and wits. Too often the urine is never even looked at; more often the microscope and powers of interpretation are not brought to bear on the condition.

A great deal depends upon the method of obtaining the urine. If I am examining the urine to determine a special point in diagnosis, I always feel it a waste of time to look over anything but a catheterized specimen. If it should prove inconvenient to get a catheterized specimen it is almost as conclusive to examine a voided specimen, if this is collected after carefully sponging the vestibule and shutting off any vaginal discharge by leaving a cotton pledget in the introitus vaginæ. When there is evidence of urethritis a two-glass specimen should be taken. In acute or subacute urethritis of gonorrhœal origin it would be unwise to catheterize, and by the two-glass method one can get a fairly correct idea of the condition of the urine from the second glass.

The problem of urinalysis acquires a new importance in this day of the small local hospital, when the specialist who is called from the city to operate usually has an opportunity to see the patient but a few minutes before operation.

Each hospital of this character should have as a portion of its equipment a microscope and the instruments and reagents necessary for the more important tests; and there

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should be a standing order for the head nurse to have in conical glasses a catheterized specimen of urine if the patient be a woman, and a two-glass voided specimen if the patient is a male.

If possible the urine should be examined while fresh. Bacteria, passed with the urine or entering by way of contamination if the urine was originally a catheterized sterile specimen, may very quickly change the picture. The reaction may be changed, casts may decompose, the hæmoglobin of the red corpuscles may be dissolved, leaving these difficult to find, and the entire field may be obscured by the precipitation of urinary salts.

We can often determine important features by simply looking at a fresh specimen. If it is clear one can say almost positively that here is no bacterial infection. With experience one can differentiate with a degree of certainty between a turbidity from the light, coarse flocculence of precipitated phosphates (which may obtain in a freshly voided specimen if the patient is extremely nervous), and, second, the heavy and variously shaped particles representing pus and epithelial clumps, and, third, the very fine, evenly distributed turbidity of a bacteriuria. Among the abnormal constituents which we may often suspect from a macroscopic examination are pus, connective tissue, blood, and bile; among the rarer finds are stone particles, dermoid cyst contents (such as hair, sebaceous material, and fat), and the contents of an extra-uterine gestation sac.

If the fresh urine looks perfectly clear, one is usually satisfied after making the physical and chemical tests for evidences of diabetes and Bright's disease. But mistakes will occasionally be made if the microscope is not brought into use even in macroscopically clear urine. (See Dr. Hamburger's case cited above.) In renal calculus and in the early stages of tuberculosis the urine not infrequently looks clear, but contains microscopic quantities of pus and blood.

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When pus or blood, or both, are found in the urine our first duty is to locate their origin. A catheterized specimen excludes the urethra. The history of the disease is an uncertain aid. A kidney may be far advanced in tuberculous disease and the bladder quite uninvolved, and still the patient may have no symptoms except of the bladder. Palpation findings may be more helpful.

A periurethral or suburethral abscess as a source of pus is easily found by inspection and palpation. A thickened and tender bladder wall or a thickened ureter is discovered by palpation, and a stone may be located in the bladder or ureter. Stone low in the ureter may cause much pain and tenderness in the rectum, as may an inflamed appendix hanging over the pelvic brim. Stone lodges just above the pelvic brim in about 10 per cent. of cases of stone in the ureter. Pain and tenderness in these cases may simulate appendicitis. In any inflammation of the ureter palpation over the pelvic brim will frequently show a cord-like body, and elicit tenderness and a desire to micturate.

Too much importance should not be attached to apparently negative palpation findings in the kidney region, as a badly diseased kidney may be smaller than normal, and lack special sensitiveness.

Cystoscopy discovers disease of the bladder or excludes this organ.

There are some urinary features which may help differentiate kidney from bladder disease. The urine is likely to show more albumin if the disease is in the kidney. If the disease is in the bladder there is likely to be more mucus, and if the infection is by an alkali-producing organism the urine when voided may be heavy with triple phosphates. Blood appears in the form of clots more frequently from bladder disease, but I have seen the bladder one-quarter filled by clots and the urine showing nothing but diffused blood. The presence of any feature suggestive of bladder disease does not exclude associated disease of the kidney.

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Our later text-books are properly revising the old statement about an alkaline urine indicating bladder as contrasted with kidney disease. These statements probably originated before the importance of examining fresh urine was recognized. We now know that in diseased conditions the reaction except when influenced by drugs usually depends upon the micro-organism present. The majority of cystitis cases have an acid urine. My observations on the bacteriology of cystitis agree with those of most of our recent workers in crediting the colon bacillus, an acid producer, with at least one-half of all bladder infections.

Some observers lay great stress upon the nature of the epithelial cells as an aid to diagnosis. While I can see a distinct increase in the ratio of small round cells and goblet cells in the specimens catheterized from the kidney, yet I have no confidence in my ability to say where the disease lies if I am presented with a mixed specimen of urine without further data.

If the disease lies above the bladder it is with rare exception in the kidney. The most frequent causes of pus and blood from the kidney are stone in the kidney or ureter and tuberculosis. Other conditions to be borne in mind are tumor, pyelonephritis during and following the infectious fevers, pyelonephritis during and following pregnancy, acute suppurative nephritis or the so-called surgical kidney, and acute nephritis from exposure. The history and condition of the patient and the character of onset of the kidney disease will be helpful factors in differentiating these conditions. The sudden onset of suppurative nephritis or surgical kidney with pain, fever, chills, and prostration may be imitated by stone or tuberculous disease when the first intimation of their presence comes from a sudden blockage of the ureter. The onset of calculous and tuberculous diseases are usually insidious. Only five of the cases of tuberculosis which I reported last year gave a history of acute onset. Other insidious conditions in which we may get hemorrhage are

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the so-called idiopathic hæmaturias and chronic interstitial nephritis.

As before stated, the most frequent causes of blood and pus from the kidney are stone and tuberculosis, and unless the history of other conditions points strongly to some other source we generally begin further examination to identify or exclude one or both of these diseases. Although the history, the cystoscopic appearances, the tuberculin test, the wax-tipped bougie, and the *x*-ray are all helpful in making a diagnosis, they all fail at times and it is the urine upon which we must place the chief reliance. The absence of tubercle bacilli after repeated examinations makes the evidence strongly in favor of stone.[1] Tubercle bacilli can

[1] I make such positive statements about the comparative ease of finding tubercle bacilli when they are present in the urine that I am often asked for my methods. In view of the many recent developments it may be surprising that I adhere to old-fashioned methods, but this is because I have had so little trouble in finding the bacilli that I have seen no reason for changing.

I have not yet found it necessary to adopt the method of spreading a thin layer of egg albumen on the slide in order to make the specimen adhere. I suppose this result is generally obtained by virtue of the albumin and mucin present in the urine and in the elements we wish to stain. Nor have I adopted the more recent ideas of washing out the urinary salts with distilled water and of centrifugalizing with water or alcohol because of their specific gravity being lower than that of the urine and the tubercle bacilli.

I use a specimen of urine catheterized with aseptic precautions from the bladder, or preferably from the diseased kidney. I prefer to have this stand in a sterile conical glass for some hours. I am aware of the claim that tubercle bacilli have the same specific gravity as urine, but I believe that many of them settle when the urine is allowed to stand. It is probable that many bacilli are carried down with the precipitating particles of necrosed tissue, fibrin, and clumps of pus cells. For the purpose of centrifugalization I pipette the heavy sediment from the bottom of the conical glass, aiming to get only the pus layer and to avoid getting the more superficial layer of precipitated urinary salts. After transferring the heavy sediment to the centrifugal tube I sometimes add more fluid by taking some of the urine from the surface of the conical glass, but I think it would be an advantage to fill the centrifugal tube with distilled water.

The preparation of the glass slide is important. The slide is pref-

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be found in the vast majority of renal tuberculosis cases, and they are our chief dependence in making a positive diagnosis. At times when they cannot be found microscopically a guinea-pig test will be positive.

Pain and hemorrhage are more liable to be influenced by exercise in cases of stone.

The absence of growth on our ordinary culture media from a catheterized specimen of urine is very suggestive of tuberculous infection. Not an inconsiderable proportion of tuberculous cases, however, have an added colon bacillus infection.

erably new to avoid the possibility of the presence of bacteria from former staining, and it should be freshly cleaned with alcohol to remove all grease. The sediment is pipetted from the centrifugal tube and spread over one end of the slide. I generally cover one-half or two-thirds of the slide according to the amount of sediment, and never prepare more than two slides from one specimen. I prefer to dry the specimen in the air or in an incubator, as too rapid drying over a flame results in a breaking off of the material on further manipulation of the specimen. After drying, the specimen is fixed over a flame. I am careful to apply the heat gradually and to avoid overheating, as it is a great satisfaction to look over a field with well-preserved leukocytes and epithelial cells. After each passage through the flame I touch the slide to the back of my left hand and when the stroke becomes painful I consider the specimen sufficiently fixed.

Before staining, the slide is "cleared" by immersing for a few minutes in a jar of 95 per cent. alcohol or equal parts of alcohol and ether. This probably dissolves any excess of mucus and some of the urinary salts, and my colleague, Dr. T. R. Brown, thinks it results in a further gluing of the bacteria to the slide.

After covering the specimen with carbol-fuchsin the slide is heated for four or five minutes over the flame. I apply the heat slowly, increasing it gradually so as to get an active escape of steam during the last minute. After washing under the tap the slide is placed in a jar of 95 per cent. alcohol to which is added a few drops of hydrochloric or nitric acid. After complete decolorization the specimen is counterstained with Loeffler's methylene blue, when, after washing under the tap and drying, it is ready for the microscope.

I seldom have to spend more than five minutes in finding the organisms, but do not consider the specimen negative until I have spent at least a half-hour on each of the two slides. Nor do I allow one day's examination to negative a suspicious case. I have examined the urine on five consecutive days before being convinced that the case was not one of tuberculosis.

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The finding of tuberculous lesions in other organs is strong evidence of the kidney disease being tuberculous.

The passage of gravel either recently or in former years makes the diagnosis of stone more probable.

It must not be forgotten that coincident with blockage of the ureter there may be periods corresponding to the patient's most serious attacks of colicky pain, chills and fever, nausea and vomiting, and general prostration, in which normal urine is passed.

The significance of the urinary examination in women is a subject of such broad relations that it is extremely difficult to treat of it in a brief paper and to confine one's self strictly to any one phase of the subject. I have made no mention of the extreme importance of repeated delicate tests and careful microscopic examinations which the internist often finds necessary in cases where the headaches, indigestion, increased arterial tension, disturbance of vision and retinal hemorrhages, all speak louder than words for interstitial nephritis, but where an ordinary hurried examination of the urine fails to show albumin or casts.

Nor have I spoken of the most valuable work now in progress which promises through the examination of the urine to clarify our ideas regarding the toxæmias of pregnancy, and, by differentiating the anomalies of metabolism, to give us a more rational therapeutics for the vomiting of pregnancy and the uræmic states.

If the relation of a few cases has awakened a determination to have a careful urine examination in every case of abdominal or pelvic disease, the object of this paper has been accomplished. My remarks on the differentiation of conditions after finding the evidence of urinary tract disease are neither new nor exhaustive, but to some of you they may be helpful by indicating what you may do with the aid of but one instrument, the microscope.

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A CASE OF UTERUS DIDELPHYS.

WITH DELIVERY OF FULL-TERM CHILD BY CÆSAREAN SECTION FROM ONE ORGAN AND HYSTERECTOMY OF OTHER FOR A LARGE MYOMA.

By George Ben Johnston, M.D.,
Richmond, Va.

Although anomalies of the female organs of generation from developmental defects are by no means uncommon, the present case by virtue of several unusual features seems of sufficient interest to justify presentation before the Society.

The origin of the uterus and vagina from the blending of two distinct tubes, the Müllerian ducts, during the third and fourth months of fetal life affords opportunity for varying degrees of abnormality corresponding to the stage at which this fusion may be arrested. Thus on the one extreme two distinct perfect uteri and vaginæ may be formed, or one normal uterus and vagina with an accessory rudimentary organ, or two uteri and one vagina, or two partially united uteri known as the bicornate uterus, or, lastly, the nearly perfect uterus, where only a septum persists as evidence of the dual origin. The most extreme grade of deformity, known as the uterus didelphys, is not particularly infrequent, occurring, according to Noble's[1] figures, in 14 per cent. of these developmental deformities, while Hill[2] considers it the most common form. Noble gives 50 per cent. of double uteri

[1] American Gynecological and Obstetrical Journal, March, 1901.
[2] American Journal of Obstetrics, January, 1903.

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occurring with a double vagina, while Hill gives 70 to 75 per cent. Although Pozzi[1] is inclined to consider avatism as a possible etiological factor in such cases, these women do not seem to exhibit any other evidences of degeneracy or a reversion of species. Of the many hypotheses which have been advanced to account for the defect, that of Thiersch seems the most plausible. He assumes that an increase in development and persistence of the ducts and a wider separation of the Wolffian bodies upon which they lie prevent their proper union. In support of this Kussmaul draws attention to the fact that these women have an unusually wide pelvis, so tending to separate the ducts.

The only symptoms to which the deformity gives rise previous to pregnancy are dysmenorrhœa, metrorrhagia, or menorrhagia, and occasional difficulty in coitus from the impeding vaginal septum. The majority of cases which are discovered previous to pregnancy come with a complaint of painful or irregular menstruation. At the same time that the present case was in the hospital a girl came to me with history of severe dysmenorrhœa, and examination showed double vagina, two cervices, and double uterus, both sharply anteflexed. A double dilatation and curettage with division of the septum and formation of a single vagina relieved the symptoms. In a case reported by Da Costa before the Section on Gynecology of the College of Physicians of Philadelphia, a similar case was cured of severe dysmenorrhœa merely by dividing the septum. I believe the septum should always be divided when found in one of these cases, except where previous normal labors have demonstrated that it affords no obstruction to the head.

If found in the virgin such a prophylactic measure may prevent embarrassment in coitus after marriage, as in Brode's case, or the establishment of urethral coitus, and later will obviate operating upon the turgid vagina during labor, which may become necessary, as in Dr. Noble's case, when

[1] Invite de gynécologie, p. 1216, Paris, 1897.

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the hemorrhage is very difficult to control, besides exposing a large, raw, bruised area for postpartum infection.

A third case of uterus didelphys which I had several years ago menstruated every two weeks, first from one uterus and then from the other, each period lasting two days, and apparently losing in the month only about as much blood as at a normal menstrual period. Such irregularities in menstruation are common in this abnormality, and a history of bleeding every two weeks or three weeks is frequently given. One case bled three weeks out of every four in each month. This hemorrhage may be so profuse as to necessitate a hysterectomy of one uterus. The gravest complication of these developmental defects is pregnancy, especially where it occurs in a rudimentary horn or organ, where the walls are usually thin and subject to the same dangers of rupture as a tubal pregnancy. Where both organs are well developed pregnancy is without especial danger, except from the obstruction of the vaginal septum.

The dual organ seems to favor conception, according to Stavely.[1] Berard reports a woman who had seventeen children, Picot one with fourteen abortions, and Goutermann one with three children from left horn and nine abortions from the right. My present case shows a similar tendency to abort from one uterus, as I believe the four abortions were from the left uterus and the three full-term pregnancies in the right. Kosleusko[2] reports a case in which one child in a twin pregnancy came from one uterus and the second was delivered by high forceps from the other uterus.

The presence of two vaginæ and two cervices may cause considerable confusion in examination if the two sides differ, as in the celebrated case of Mai and Fischer. In consultation over a difficult labor case one was positive he found the cervix firm and not showing any tendency to dilate; the other was equally certain that the cervix was partially thinned and

[1] American Journal of Obstetrics, January, 1902.
[2] Cent. f. Gyn., No. 2.

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patulous. After a heated argument they both decided to re-examine the woman in order to convince the other, when to their amazement each found the condition previously found by his colleague.

When I first saw my case she was five months pregnant, and the first digital examination without a speculum did not reveal the anomalous condition. At this time a large fibroid to the left almost completely blocked the pelvic canal, but as the woman had had four abortions and two destructive operations on full-term children, and was extremely desirous of a living child, it was determined to allow the pregnancy to go to term, if it would, and then deliver by Cæsarean section.

At a later examination in the seventh month the double vagina and two cervices were discovered, but the septum was left undisturbed, as delivery was to be by another route.

At the time calculated for term a living child was delivered from the right uterus and a hysteromyomectomy done on left organ.

The full history of the case is as follows:

Family History. Negative.

Personal History. Had usual diseases of childhood. Always healthy, strong woman. Menstruation began at thirteen, always regular. Pain before and during period, which usually lasted four to five days. Slight leucorrhœa for several years past. Four abortions in the fourth to seventh week. Two full-term children had been delivered by destructive operation. Says that one of the pregnancies lasted twelve months. Is at present at term in her seventh pregnancy.

Present Illness. First noticed a tumor in the left lower abdomen (left iliac region) ten years ago, which would increase in size during each pregnncy and diminish after abortion or delivery. The swelling causes considerable pain when in the erect position, walking being well-nigh impossible. Left foot, ankle, and leg have been swollen and tender for the past eight months.

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Physical Examination. Patient is well nourished and seems strong and robust. Chest normal shape; expansion good and equal. Mammæ prominent, with marked areolæ and fluid exuding from nipples. Vocal fremitus normal. Both sides resonant, and breath sounds clear.

Heart. No apparent enlargement. Sounds clear.

Abdomen. Greatly distended, outline apparently indicating two tumors. On the left side is a hard mass protruding into the abdomen and extending downward into the pelvis and but slightly movable. On the right side and crossing the midline could be easily made out the outlines of the child in left anterior occipitoiliac position, with head unengaged.

Vaginal Examination. On separating the vulva the vagina is seen to be completely divided by a thick, perpendicular septum, on each side of which is seen a cervix with slight tears. A mass can be felt almost completely blocking the parturient canal and extending upward over brim of pelvis, where it was seen to be continuous with the mass found in abdominal examination. The right cervix is more softened, but its upward extension is difficult to trace on account of the occluding tumor. Left foot and ankle œdematous.

Urine. Amber and clear. Specific gravity, 1028; acid; no albumin; no sugar; no bile. Microscopically, few blood cells and numerous calcium oxalate crystals. No casts.

Operation. Cæsarean section of right uterus, hysteromyomectomy of left uterus. Anæsthesia, gas and ether. Incision in median line from level of costal line to symphysis, exposing gravid uterus on right side and tumor about the size of a child's head in left fossa, coinciding with the outlines of left uterus. Each uterus has a single tube and ovary. The cervices uteri coalesced, but each with a separate os opening into separate vaginæ. The right uterus was delivered and a vertical incision made through the anterior wall about four and a half inches in lengrh. The fœtus was delivered without difficulty, hemorrhage being controlled

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meanwhile by direct pressure on the uterine vessels and a few artery clamps along the incision. Cord was divided between two clamps. The placenta was found attached laterally; it was left temporarily, the uterine cavity packed with gauze, the incision closed with temporary interrupted silk sutures, and the whole returned to the abdominal cavity. The tumor and left uterus were then brought forward; the ovarian vessels, round and broad ligaments, and uterine vessels ligated and divided in turn. An anterior and posterior peritoneal flap was then made around the cervix and reflected, the cervix amputated and fibres connecting it with right uterus divided. Uterus with tumor was then removed, and the stump closed with interrupted silk and then covered with peritoneum. The right uterus was then taken up and delivered, the temporary sutures removed, and the cavity emptied of packing and placenta and membranes and cervix dilated two inches with Goodell dilator. The wound in the uterus was closed with interrupted No. 4 silk sutures about three-quarters of an inch apart, uterus returned to cavity, and wound closed. The patient left the table in good condition and made an uneventful recovery, except for rather marked delirium during first twelve hours after operation and slight febrile rise, 100.5°, which became normal by fourth day.

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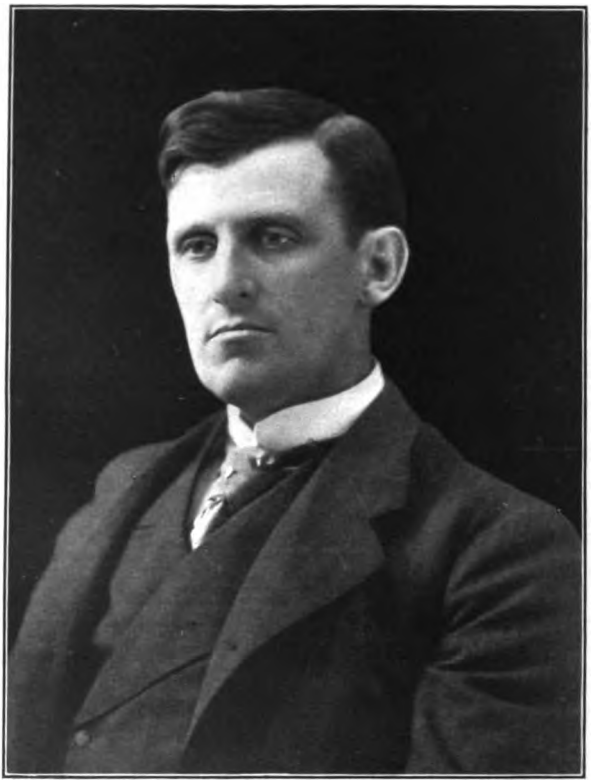

William R. Pryor

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IN MEMORIAM.

WILLIAM RICE PRYOR, M.D.

BORN 1858; DIED 1904.

AMONG the few men whose early demise our Society has been called upon to mourn was Dr. Pryor. At our meeting in 1903 he was not present, owing to pressure of professional engagements, but the impression he made at his last meeting with us, and the one that his presence always inspired, was that of great physical force and endurance. It was therefore with no slight degree of surprise and shock that the news of his death fell upon our ears.

Dr. William Rice Pryor was born at Richmond, Virginia, in the year 1858. His early boyhood was spent amidst the frightful scenes of the war of Secession. His father, who had been a Congressman from Virginia from 1857 till the withdrawal of his State from the Union, became at the outbreak of the war a general in the Confederate army. He was stationed in and about Richmond throughout most of that sanguinary conflict. His family kept near him, suffering almost incredible privations and sacrificing all to sustain the forlorn struggle to the end. A somewhat passive, but impressionable, participator in this heroic experience was the subject of our sketch. As has been said by Dr. C. J. Maguire,[1] "Introduced to the world at a most stormy and momentous period of the history of this country, just before the war of Secession, it often seemed to

[1] New York State Journal of Medicine, January, 1905.

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me that he absorbed there, while yet unborn, that strong, uncompromising, defiant expression of what he believed to be right or wrong, which we all recognize in the fiery and heated debates of that period." These impressions were continued during his early boyhood.

Dr. Pryor had careful training at his mother's knee and in the preparatory schools of Virginia, after which he entered Princeton University, where he remained two years. He withdrew from Princeton to take up the study of medicine at the College of Physicians and Surgeons (Columbia University), New York, from which he graduated in 1881, and from his interneship at Bellevue Hospital in 1883. He located in New York, and began practice in association with Dr. W. Gill Wylie and Dr. H. Marion Sims, in both their private practices and at the Polyclinic Medical School and Hospital. He was devoted to his profession from the first, and proved himself an assiduous and conscientious worker. From clinical assistant at the Polyclinic he rose rapidly through the successive grades of instructor, lecturer, and adjunct professor to the Professorship of Gynecology in 1895.

Dr. Pryor was a clear and forceful teacher, and inspired all who came within his influence with the spirit of careful, accurate observation and conscientious work. His enthusiasm was contagious. He was in his element in presenting to his class the points of contention over some disputed pathological or statistical question. Nothing could be more picturesque than his gigantic form arranged in a loose operating suit of white, his head tied in gauze to absorb the perspiration which flowed freely as he walked back and forth swinging a towel in his hand and enunciating his precepts in stentorian tones.

With his assistants and nurses at operation he was imperious and exacting. Ever watchful for any flaw in asepsis on the part of either doctor or nurse, he never hesitated to rebuke it in scathing terms, and thereby impressed the lesson on both actor and spectator. His aseptic technique was fault-

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less. He was a leader in this feature of the surgery of the Polyclinic, and was the most potent influence in establishing and maintaining there the present successful system of aseptic practice and instruction.

As an operator Dr. Pryor was rapid, accurate, direct. He knew his anatomy and made practical application of it. His name will ever be associated with the operation of vaginal hysterectomy, which he worked out so accurately and performed with such marked success. His method of rapid enucleation in the removal of intraligamentary fibromyomatous tumors of the uterus is a distinct contribution to the technique of this work, and his treatment of puerperal sepsis in isolating the uterus from adjacent structures by surrounding it with iodoform gauze and securing drainage of the peritoneal cavity through the vagina stands to-day as the best, the accepted treatment for that refractory malady.

The last problem that engaged his attention was the radical abdominal operation for cleaning out the pelvis of all the generative organs and lymphatics in cancer of the uterus. He entered upon this study in his characteristic thorough way by careful, painstaking dissection, not only of the normal cadáver, but in autopsies of cancerous cases in which the glands had become involved and the streams of infection were indicated. Then he began his operations for the relief of these desperate sufferers, never losing sight, however, of the scientific feature of the investigation. He was engaged in this study at the time of his death. His results and conclusions were therefore never given to the public. Privately, however, he expressed to his friends his disappointment over the outcome of his experience, and confessed that he was convinced that the operation was not to be adopted except in selected cases, based on early recognition.

As a man Dr. Pryor was warm-hearted and impulsive, a volatile nature easily elated and as readily depressed. He took his work seriously, thought out his own conclusions

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independently, believed in them thoroughly, and defended them valiantly against all comers. He had a ready command of language and delighted in a well-sustained, intelligent debate. He was a devoted son, husband, and father, and to those who knew him a well tried and trusted friend.

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